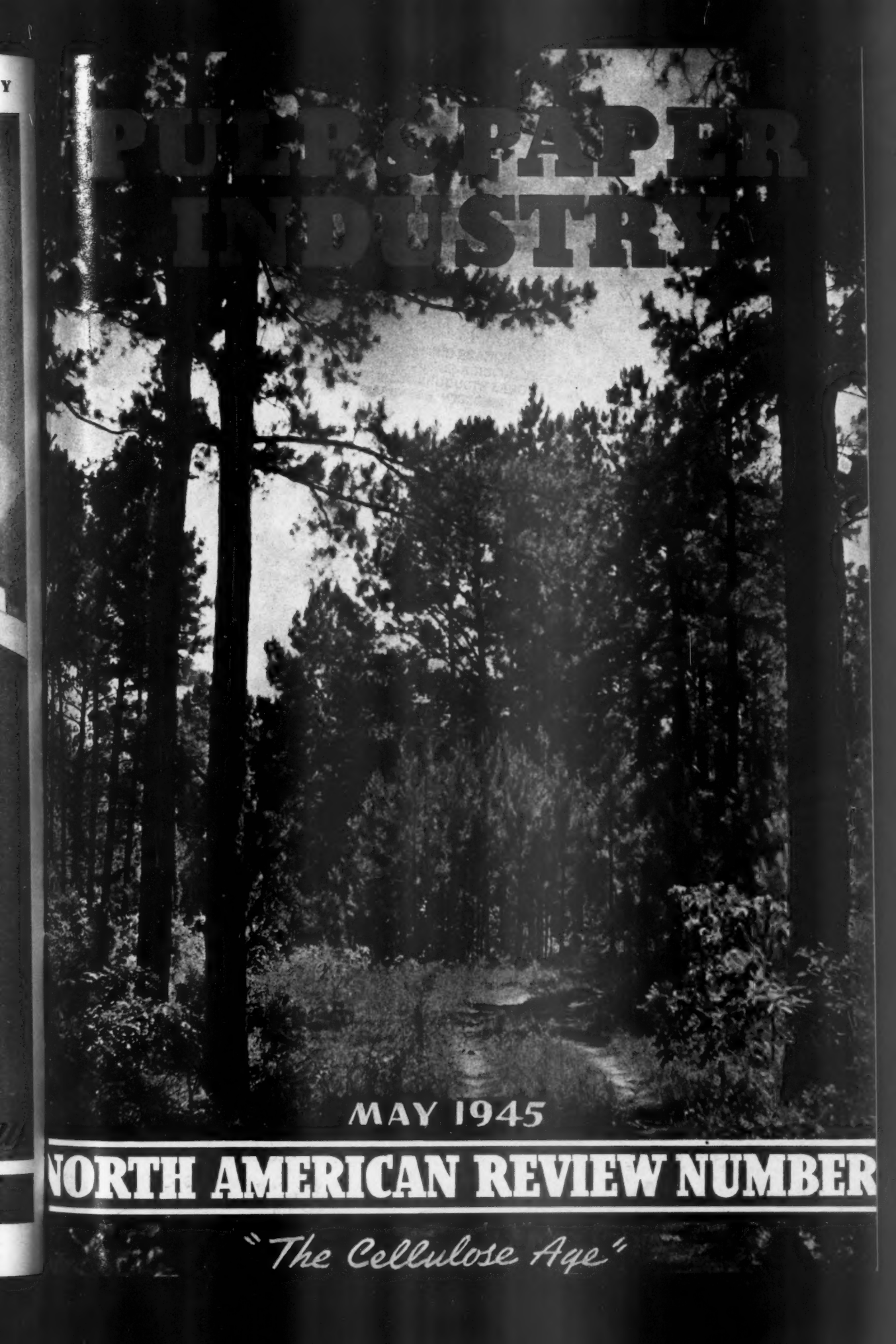
PULP & PAPER
INDUSTRY
MAY 1945
NORTH AMERICAN REVIEW NUMBER
"The Cellulose Age"

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Pulp & Paper Industry is published once a month, at 71 Columbia St., Seattle, Wash. Subscription: U. S., $4.00; Canada, $4.50; other countries, $5.00. Entered as second class matter May 20, 1927, at the Postoffice at Seattle, under the Act of March 3, 1870. Copyright, 1945, by Miller Freeman Publications.

PULP & PAPER INDUSTRY

"The Cellulose Age"

TRADE MARK APPLIED FOR

Vol. 19 — No. 5

MAY • 1945

MEMBER AUDIT BUREAU OF CIRCULATIONS

The Management Journal Covering North America's Wood Pulp, Paper and Cellulose Industries

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SUBSCRIPTION RATES

United States	$4.00
Canada	$4.50
Other Countries	$5.00
Single Copies	$ .35
Review Number	$1.00

THE No. 1 PROBLEM

Editorials

THE most urgent and most important problem facing the management of a pulp and paper industry today is its future supply of pulpwood.

In the months and years to come, this problem will be hardly less urgent and important, except for those fortunate managers and executives who have been able to place their enterprises on a permanent basis of operation. It can be done.

Because this is likely to be the most urgent and most important problem facing the industry for some time to come, we decided to devote the principal part of this North American Review Number to a discussion of the problem. We have gathered all of the latest available informaion on this subject, particularly affecting the future of the industry in all parts of North America. We hope this information will be useful to the management of industry of the four great U. S.-Canada producing areas—the Northeast, the Middle West, the South and the Pacific Coast.

In earlier issues this year, PULP & PAPER INDUSTRY published two widely discussed forecasts on production in pulp and paper. One was the Housley report on "Postwar Paper and Paperboard Demand" (Jan. 1945) and the other was "World Pulp & Paper Forecast" by W. LeRoy Neubrech (February, 1945). Both are reviewed on page 139 of this issue.

These forecasts estimated new high records of paper production would be reached after the war to meet record-breaking demands. But the question they left unanswered is: Where is the pulpwood coming from? This issue of the North American Review Number is an attempt to answer that question. No question—as we see it—could possibly be of greater importance to the industry.

The ability of the North American forests to sustain any exceptional increased demand upon them has been seriously questioned by many experts. There is no doubt that if our forests are going to support a pulp and paper industry two times as great as it was in the years before the war, as well as other forest industries, it will require enlightened government policies, including taxation which encourages, rather than discourages raising timber as a crop. It also will require as an expansion of sound forest conservation policies among those companies which presently are not employing sound practices in the woods and in their manufacturing processes.

A lack of manpower and lack of equipment has prevented many companies from initiating the practices and processes which will place them on a true perpetual yield basis in the woods and a perpetual production basis in the mill. After the war, they hope to go ahead—full speed.

CONCERNING STATISTICS

FOR many years this statistical volume of PULP & PAPER INDUSTRY—published every May—has been the most complete and comprehensive review of the North American industry published anywhere. You probably will thumb through this volume many times during the course of the ensuing year—until you get your 1946 volume.

But before you take all the tables and statistics and charts as the final answer to everything, it might be well to consider the humble bumble-bee.

According to all statistics, to aerodynamic laws, to results of laboratory tests and wind tunnel experiments, the bumble-bee just can't fly. But the bumble bee never heard of statistics—he just goes ahead and flies, and makes a little honey on the side, too.

PULP AND PAPER INDUSTRY OF THE AMERICAS
U. S. Mills Total 2.88 Billion Dollar Investment

SIX hundred and five companies operate 830 primary paper mills and 368 pulp mills in the United States, Canada and Newfoundland. An additional 103 primary mills are in Latin America from the Rio Grande to Terra del Fuego.

The products of the pulp and paper mills of the United States have been estimated by association officials at around $2,000,000,000 per year. Products of the Canada-Newfoundland industry run over one-third of a billion dollars.

The primary mills in the United States represented an investment in 1944 of $2,880,000,000. Investment in Canada-Newfoundland is about two-thirds of a billion dollars.

Under recent calculations, the average investment in a pulp mill is $17,500 for each person employed.

Similarly, the average investment in a paper mill is about $12,000 per person employed.

The U. S. industry paid wages of $329,000,000 to 147,000 persons in 1944. North of the international line are another 40,000 employes. An interesting sidelight is that 400,000 more in the U. S. are employed in printing and publishing, which is dependent on the paper industry.

There are 522 companies in the U. S. and 83 in Canada and Newfoundland, operating 104 paper mills and 117 pulp mills north of the border and 725 paper mills and 250 pulp mills south of the border. Many pulp-paper operations are combined. In the U. S. alone there are 90 groundwood mills, 69 sulphite pulp mills, 52 sulphate or kraft, 21 soda and the remainder of the pulp mills are of miscellaneous type. Canada and Newfoundland have 64 groundwood mills, 43 sulphite pulp mills and ten kraft mills.

Leading States

New York leads all the states with 113 paper mills and 45 pulp mills. In the papermaking field alone, after New York, are Massachusetts with 86, Pennsylvania with 57, Michigan with 56, Wisconsin with 51 and Ohio with 49.

In the pulp mill field, New York's 45 leads, followed by Wisconsin with 35, Maine with 30, Washington with 25, Oregon with 12, and Virginia, Pennsylvania and Minnesota with ten each.

New York leads in groundwood mills with 30, Maine and Wisconsin coming next with 15 each, and Washington is in fourth place with nine.

Wisconsin leads in the sulphite field, with 15 mills of this type. Washington is second with 13 and Maine, third, with 11.

In kraft or sulphate pulp, the most mills — seven — are in Louisiana. Florida, Virginia and Wisconsin each have five.

New York and Pennsylvania each have four soda mills.

Latin American Industry

In the Latin American countries, Brazil is far and away the leader with a total of 45 paper and board mills, one of which also makes groundwood and sulphite pulp and another soon will be making these pulps and newsprint.

There are 19 paper and board mills in Argentina and one groundwood and one kraft pulp mill, and in Chile, there are ten paper mills and one making groundwood. Peru has three mills, including one making chemical pulp. In Trinidad there is a bamboo pulp mill. Other paper and board mills in South America include four in Uruguay, two each in Columbia and Venezuela and one in Bolivia.

Pulp and paper making in Mexico is expanding, with considerable new equipment going to that country. There are soon to be 16 board and paper mills and four pulp mills making soda, sulphite, sulphate and groundwood and another will be making sulphate eventually.

Cuba has a bagasse pulp mill and four paper mills and a board mill is newly built in Puerto Rico.

CANADA--No. 1 Industry Is Pulp and Paper

PRODUCTION of pulp and paper is Canada's No. 1 manufacturing industry.

Canada's newsprint mills, with machine capacity four times the rating of the next largest producing country, have been supplying between 70 and 75% of the requirements of the United States in addition to domestic Canadian needs and the bulk of the newsprint needed during the war period by 40 other countries.

Canada produces about 20% of the world's supply of wood pulp and stands second only to the United States in volume of its manufacture.

Yet nearly all of the expansion in the pulp and paper industry in Canada has occurred since the turn of the century when domestic manufacture represented a value of only about $8,000,000 a year. Today, pulp and paper have assumed gigantic proportions among Canada's exports and the annual output is valued at close to $350,000,000.

The trend of expansion in Canada now is towards additional kraft and sulphite pulp facilities, and new construction under way or in prospect for the early future represents an outlay of more than $100,000,000, with new projects planned or being built in almost every section of the Canadian pulp-producing region, including three new kraft pulp mills in Ontario and kraft and sulphite mills in British Columbia.

During the war, the Canadian industry, topped only by gold production as a source of wealth, has been adversely affected by the loss of manpower to the armed forces and munitions plants and by the diversion of large blocks of hydro-electric power to war industry in eastern Canada and the state of New York, but by initiative and resourcefulness the industry succeeded during the 1940-44 period to exceed peacetime production of pulpwood by 35%. How Canada has been able to maintain her production of newsprint during the past few years in comparison with the U. S. is shown by these figures, in thousands of short tons:

Calendar Years	Canada	U. S. A.
1939	2,869	939
1940	3,419	1,013
1941	3,426	1,015
1942	3,177	953
1943	2,983	805
1944	2,922	720

(Bank of Canada report Jan. 1945)

In the five pre-war years annual production of newsprint in Canada averaged 3,003,000 tons, while in the five war years average annual production has been 3,229,000 tons.

Newsprint prices in Canada have been stabilized, too, in sharp contrast with conditions in World War I when prices rose from $39 per ton in 1913 to about $80 in 1919. The following are Canadian newsprint prices for New York delivery in the 1940-44 period, compared with the corresponding five years of World War I and showing the cumulative percentage increases:

	Price	Pct. Inc.		Price	Pct. Inc.
1915	$41.78	----	1940	$50.00	----
1916	51.78	24	1941	50.00	nil
1917	63.78	48	1942	50.00	nil
1918	64.30	54	1943	54.66	9
1919	79.40	90	1944	58.00	16

In April of this year a further increase of $3 a ton was put into effect in the New York price, bringing the total price to $61 per ton, or an increase of 22% over the price at war's outset, less than one-fourth the extent of the increase during the first war.

Ownership Scattered

Ownership of the pulp and paper industry in Canada is widely scattered. The inevstment represents $667,000,000, according to the 1942 Canadian census. There are 66 companies engaged in the industry, no one of which is dominant. In employment, the 106 active mills alone are responsible for more than any other manufacturing industry in Canada except lumber, and if the labor in the woods were included the industry would have at its peak of employment in the neighborhood of 160,000 men on its payroll. About half a million people are dependent on the industry.

Canadian pulp and paper naturally rely on export trade for their economic strength. Against the competition of subsidized shipments and lower costs of production in some other countries, Canada has the advantage of vast forest resources, the second largest hydro-electric power in the world, the ease of doing business with the United States and the United Kingdom and the reputation for maintaining supplies in large volume.

Many factors will determine the extent of the industry's performance in the current year, but the general expectation is that there should be an increase of from 5 to 10%, possibly more, in the volume of pulpwood produced, and it is on this basic consideration that all other elements of pulp and paper production depend.

The spring breakup in eastern Canada came earlier this year than might normally be expected and this might adversely affect hauling

Principal Statistics of Canadian Pulp and Paper Industry
(1943 is latest available)

Year	Establishments	Capital	Employees	Salaries and Wages	Fuel and electricity used	Materials and supplies used	Gross Value of products
	No.	$	No.	$	$	$	$
1919	99	275,767,364	26,647	32,264,208	12,503,197	54,084,801	137,912,502
1920	100	347,553,333	31,298	45,253,893	16,989,356	84,208,788	236,420,176
1921	100	379,812,751	24,619	34,199,090	14,961,741	62,276,224	151,003,165
1922	104	381,006,324	25,830	32,918,955	13,000,002	64,692,722	158,950,956
1923	110	417,611,678	29,234	38,382,845	18,421,804	71,322,722	184,821,511
1924	115	459,457,696	27,627	37,649,528	17,396,375	72,233,876	179,259,504
1925	114	460,397,772	28,031	38,560,905	17,506,735	76,514,990	193,092,937
1926	115	501,184,714	31,279	44,175,502	20,424,405	85,365,465	215,370,274
1927	114	579,853,552	32,876	45,674,293	24,024,319	84,813,080	219,329,753
1928	110	685,687,459	33,614	47,322,648	24,546,957	88,490,421	233,077,236
1929	108	644,773,806	34,202	50,214,445	25,356,090	96,874,749	243,970,761
1930	109	703,937,104	33,207	45,774,976	26,158,260	81,992,255	215,674,246
1931	103	630,176,540	26,669	34,792,013	22,927,919	63,947,678	174,733,954
1932	98	597,550,013	24,561	28,348,128	19,821,839	48,970,967	135,648,729
1933	95	559,265,544	24,037	26,657,542	18,902,330	47,632,521	123,415,492
1934	95	554,973,891	26,993	33,307,043	21,977,913	53,426,534	152,647,756
1935	95	545,572,938	27,836	35,893,313	22,682,883	57,995,037	159,325,546
1936	93	536,073,034	29,478	39,440,074	25,690,606	72,202,983	183,632,995
1937	98	570,352,287	33,205	48,757,795	29,121,065	91,121,629	226,244,711
1938	99	594,908,222	30,943	42,619,311	23,800,737	71,062,580	183,897,503
1939	100	597,908,918	31,016	44,737,379	25,094,978	79,933,657	208,152,295
1940	103	642,979,942	34,719	56,073,812	31,045,406	108,758,862	298,034,843
1941	106	678,937,841	37,154	63,677,818	34,437,122	125,437,012	334,726,175
1942	105	655,598,196	38,002	69,656,393	36,226,420	135,970,437	336,697,277
1943	106	667,458,143	37,020	71,199,422	36,211,064	143,956,462	345,653,470

CANADIAN INDUSTRY STATISTICS FOR 1943
(Latest Available)

		Canada	Quebec	Ontario	British Columbia	Other Provinces
Establishments	No.	106	46	40	7	13
Pulp mills	No.	28	10	8	3	7
Pulp and paper mills	No.	50	26	15	3	6
Paper mills	No.	28	10	17	1	----
Capital employed	$	667,458,143	352,925,347	188,668,105	59,288,302	66,576,389
Total employees	No.	37,020	18,118	11,002	3,867	4,033
Salaries and wages	$	71,199,422	33,245,158	22,260,167	8,159,504	7,534,593
Fuel used	$	21,470,240	10,086,986	6,380,084	2,302,934	2,700,236
Electricity purchased	$	14,740,824	9,017,086	3,617,878	64,039	2,041,821
Power employed	H.P.	1,966,533	1,023,416	563,944	147,636	231,537
Pulp-making materials and supplies	$	109,631,048	53,242,352	31,303,511	8,731,778	16,353,407
Pulp made	$	194,434,202	93,969,226	54,818,046	17,543,397	28,103,533
Paper-making materials and supplies	$	120,290,648	60,473,371	40,771,211	6,832,428	12,213,638
Paper made	$	235,362,958	117,928,840	78,234,640	15,968,062	23,231,416
Total value of materials, supplies	$	143,956,462	68,415,285	47,008,529	10,571,060	17,961,588
Gross value of products	$	345,653,470	167,460,120	108,256,330	28,881,845	41,055,175
Net value of products	$	165,485,944	79,740,763	51,249,839	15,943,812	18,351,530

"Gross values of products" represents the sum of the values of pulp made for sale in Canada, pulp made for export and paper manufactured. It does not include pulpwood, nor the pulp made in combined pulp and paper mills for their own use in making paper.

The "Net value of production" is compiled by subtracting the total value of materials and supplies, fuel and electricity from the gross value of products.

operations on snow and ice roads. Mill inventories of pulpwood early this year were at as low a level as any time since the beginning of the war, but power and water conditions were somewhat better.

In addition to its production and shipment of large quantities of newsprint and pulp for conventional uses, Canada has produced wood pulp in great volume for a variety of wartime uses. Canadian woodpulp, for instance, has been used extensively in the manufacture of high explosives, such as cordite and gun-cotton, replacing cotton linters. Dissolving pulps have been transformed into rayon, cellophane, plastics, etc.

Canada's pulp and paper industry has demonstrated during the war that it can maintain its production at a high level despite many obstacles. When these obstacles are removed, the industry should be in an excellent position to meet world demand. For the immediate postwar period, Canada's problem would appear to be not one of demand but of supply.

As restrictions on the use of paper are removed, there will undoubtedly be a steadily increasing demand for newsprint and other papers and boards throughout the world. While pulp may not be required in such large volume for explosives and other war purposes, more of it can be transformed into paper.

AUSTRALIA--Industry Grows "Down Under"

Although her woods are not ideal for pulp making, Australia has encouraged their utilization and in recent years considerable quantities of both pulp and paper have been produced there under subsidy.

Presence of a domestic pulp and paper industry has been of particular advantage to Australia during the war years, as for many months shipping services across the Pacific were severely disrupted and even now shipments to the commonwealth "down under" have necessarily been sharply curtailed.

Normal peacetime consumption of newsprint in Australia is more than 170,000 tons. Principal imports have been from Canada. Present rate of manufacture in Australia is about 30,000 tons of newsprint, 20,000 tons of writing and book paper, 140,000 tons of wrapping paper and board. Future of the industry will depend largely on tariff policy.

Most Australian forests belong to the eucalyptus family; there are no extensive softwood forests. The eucalyptus is not to be compared with the softwood pulping species of this continent. It is a hardwood, with short fibre, about one-third that of conifers, high in content of organic acid, tannic and acetic. Groundwood made from it requires special precautions against staining.

P. R. Sandwell, now development engineer of Ontario Paper Co., Thorold, Ont., and formerly resident engineer of Australian Newsprint Mills Pty., Ltd., states:

"Of the species which occur in any great volume, one eucalyptus regnans, the swamp gum of Tasmania, can be used in the groundwood process. At least ten can be used in the alkaline pulp processes. Many can be used for wallboard. None is suitable for the acid process. Their reaction to the various semi-chemical processes which are now being developed for North American hardwoods is not yet known.

"The groundwood pulp manufactured from eucalyptus regnans is comparatively weak, has a reddish cast, and will stain blue-black in the presence of iron. In combination with softwood sulphite it can be used in the manufacture of a reasonably good newsprint. Its reddish cast can be corrected by the use of bleaching or brightening reagents which, unfortunately, require the removal of the dissolved coloring matter by washing, with a subsequent loss of heat and fines. Its tendency to stain can be stopped by the use of non-ferrous materials in the construction of the plant and equipment in which it is produced."

Nearly all the true paper pulps are confined to the manufacture of newsprint, printings, writings and wrappings. About 80 per cent of the newsprint furnish is native pulp, the remainder being imported sulphite, much of it from Powell River and Ocean Falls, B. C.

An optimistic view of the future is taken by Sir Norman Brookes, one of the leaders of the industry, who declared recently: "In the postwar period we have every reason to believe that an export trade in our eucalyptus bleached chemical pulp may be established."

Papermaking in Argentina

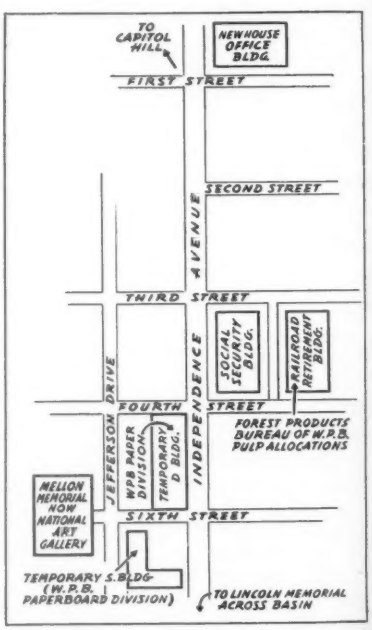
The Argentine papermaking industry has been greatly expanded in volume as well as in the types and qualities produced since 1939.

The industry consumes more than 40,000 tons of imported wood pulp annually. In addition, it uses around 30,000 tons of locally produced straw cellulose and 3,000 tons of domestic wood pulp from the poplar plantations at the delta of the Parana River at Buenos Aires. The production of cellulose from wheat and flax straw has been increased since 1941.

The local industry produced 110,000 tons of paper in 1941. The increase in local production since that year will take care of 75 per cent of the needs of the local market for all papers except newsprint.

Argentine Imports of Paper

	1938	1939	1942	1943
Newsprint ..	9,206	10,632	9,626	16,895
Other papers—				
N. Amer...	1,456	1,477	9,638	3,436
Europe	10,911	9,674	13,543	9,599
Total	21,573	21,783	32,807	29,930



ABOVE SECTIONAL MAP OF WASHINGTON, D. C., shows how close together are three important divisions agencies affecting the pulp and paper industry.

The Forest Products Bureau and Pulp Allocations Office are in the Railroad Retirement Building on the Third St. side. Near Fourth St., across Independence Ave., is the Paper Division, in Temporary D Bldg. On Jefferson Drive, near Sixth, is the Paperboard Division, in Temporary S Bldg. Officials in the three buildings, walk to joint meetings.

GOVERNMENT REGULATION-- Now and in Future in U. S. and Canada

THE only constant in the Washington scene is change — and with the war in Europe over, new changes are in the air concerning the pulp and paper industry as is the case everywhere else in the capital.

State Department, Treasury Department, War Production Board, Office of Price Administration, Foreign Economic Administration, Department of Commerce, War Manpower Commission and Forest Service were among the Washington departments and agencies whose interest in, and control or influence over, the pulp and paper industry fluctuated throughout the war years.

Some important fluctuations were noticeable as war ended in Europe. Reconstruction and relief in the liberated countries became a paramount consideration. The State Department, as trade lanes opened up, became increasingly concerned over pulp and paper exports and imports as they might affect or be a weapon of foreign policy. The FEA's interest, strictly under State Department control, also increased.

Strong representations for price relief in certain paper lines brought the OPA into more prominence. Its declared policies called for relief—item by item — in the transition from war to peace.

More rapid relief of industry from WPB restrictions than many have expected, seemed likely after the war ended in Europe. One reliable prospect is that it may be possible to discontinue allocations of pulp by the end of the third quarter, 1945, with Swedish pulp relieving the situation. However, end use controls of pulp were likely to continue into 1946.

J. R. ATWATER, Price Executive, Paper and Paper Products Price Branch, OPA.

BENTON R. CANCELL (left), Director, Forest Products Bureau, War Production Board, and WALTER H. WILCOX, Director, Paper Division, Forest Products Bureau.

With V-E Day passed, there was expected to be a rapid release of most of the equipment orders for pulp and paper mills. About $9,500,000 worth of these orders had been held up in WPB files. And many more new orders, which had never been submitted in application form, were flooding that office. An additional $12,000,000 worth of pulp and paper construction projects had been deferred. Releases of these would not now be as rapid.

Possibility of taxation relief turned attention of the industry to the Treasury Department.

There were predictions that the excess profits tax would be eliminated and the normal-plus-surtax reduced.

The change in the White House —for the first several weeks, anyway — was apparently delaying, rather than bringing about, a number of changes. These included the interesting and significant question of how much influence the Department of Commerce might have over the industry if, and when, the war agencies disband.

White House Policies

It was believed Henry Wallace's powers as head of this department, would be considerable. President Truman, however, might have other ideas, although for the immediate period after taking office, he was not showing any signs of departing radically from the policies of Mr. Roosevelt. The latter had asked the Forest Service to make a survey of timber resources, with a view of determining what aid could be given war-ravaged countries and he had encouraged in this department the development of plans for nationwide controls over forest-utilization.

Mr. Truman apparently was trying to avoid domestic issues in his first weeks in office; rather, concentrating on strengthening the unity of the nation.

It is known the WPB officials, including the paper industry men, have a program laid out for their dissolution. But will the government let them carry it out?

Pobably the most important recent change in the War Production Board, as it affected the pulp and paper industry, was the promotion of Harold Boeschenstein, president of Owens Corning Fiberglass Corp., to a top position in WPB directing operations, and the promotion of Benton R. Cancell to succeed Mr. Boeschenstein as head of the Forest Products Bureau. Mr. Boeschenstein, who directed the organization of the latter bureau in the late summer of 1943, in order to coordinate all cellulose-using industries, had won the confidence of industry by his stressing of production instead of restriction as his policy.

His advancement to near the top of WPB could be of benefit to the pulp and paper industry, as he knows its problems so intimately, and he comes from a related industry himself. The fact that he was so very close to the pulpwood production campaign during 1944 also was bound to bring high in war councils a man who truly appreciated the importance of the forests to national

economy.

Forest Products Bureau

Mr. Cancell, whose home was Ogdensburg, N. Y., before the war and who was engaged in pulp and paper industry association work before he went with WPB, brings to his new post a close association with wood production and also experience in international dealings with Canada authorities on wood resources problems. He is a pulp and paper industry man, and thus his advancement to director of the overall bureau for lumber, paper, paperboard and printing and publishing, indicates an increasing importance for this industry in Washington.

RALPH A. POWERS (left), President, Robertson Paper Co., who has been Director of the Paperboard Division, of the Forest Products Bureau, WPB, several months, and W. IRVING OSBORNE, Jr., President, Cornell Wood Products Co., who joined him in May as Deputy Director.

His offices are in the Railroad Retirement Building. Added to the Printing and Publishing Division as advisor recently was another paper industry man, Earl M. McCourt, of Consolidated Water Power & Paper Corp.

Walter H. Wilcox, on leave as assistant to the president of S. D. Warren Co., has been head of the Paper Division since last fall, and Ralph A. Powers, president of Robertson Paper Co., is director of the Paperboard Division.

W. Irving Osborne, Jr., president of the National Paperboard Assn., and president of Cornell Wood Products Co., is an important recent addition in the WPB, taking over the post of deputy director of the Paperboard Division in May.

On May 7, Grant Richardson, of Hammermill Paper Co., became assistant to the director of the Paper Division. This new appointment was expected to figure prominently in transition of this division to a peacetime status, and stress on rehabilitation in Europe, in which he has been identified as advisor to FEA.

Mr. Richardson takes with him a background of more than 30 years' experience in paper manufacture and selling. For several years he has been district sales manager for the Eastern territory and export manager for both Hammermill Paper Co., Erie, Pa., and Grays Harbor Pulp and Paper Co., Hoquiam, Wash.

Another important Paper Division change was the resignation of Allan Hyer as chief of the distribution section. After being on the spot (in more than one way) since near the beginning of the war, Mr. Hyer returned March 20 to his pre-war duties as sales manager of Black-Clawson Co. of Hamilton, Ohio. He has been replaced by Walter Croan, formerly with West Virginia Pulp & Paper Co., and more lately in civil service, who now holds the title of acting chief of the section controlling the distribution of paper and pulp making machinery for both foreign and domestic installation.

Another recent resignation of a man long in the Washington service came when H. O. Nichols returned to Crown Zellerbach Corp., after acting as chief of the coarse paper branch of the Paper Division since November, 1943. His Washington position is now held by Charles J. Dynes of the Sorg Paper Co., who was formerly stationed at Vancouver, B. C. He has been in Washington for about a year as industrial and specialty paper specialist in the Paper Division. This place is now being filled by Robert Foley of Hollingsworth & Whitney Co.

Dynes Directs Division

In May, when Walter Wilcox was away from Washington, Mr. Dynes was "acting director, Paper Division, WPB." Other changes were imminent on V-E Day, but apparently were being held up by the difficulty of obtaining A-1 successors. With V-E Day here and gone, many key men in Washington were anxious to return to their former activities. Many had their bags packed as long ago as last fall when the German break-through again ended the war picture and delayed their departure.

One of the significant changes during the past year was the installation of Mr. Wilcox as director of the Paper Division of WPB. In his nine months in Washington he appears to have done an excellent job, and to have gained the confidence of the entire industry. No small part of the task has been to hold in their chairs the majority of experienced personnel, and to persuade new men to take the places of those who found it necessary for reasons of health or business to resign.

An important Paper Division post, in view of the critical state of wood supply, was that of Curtis Hutchins of Bangor, Me., chief of the pulpwood production branch. He came with WPB about the time Mr. Wilcox did, succeeding the Hovey-Madden team in regard to important activity of getting wood to the mills.

A young veteran with the Paper Division is James Killen, of the American Federation of Labor who is labor specialist. Franklin Hufford, from Castanea Paper Co., transportation specialist, left this month to be traffic manager for Minnesota & Ontario Paper Co.

Robert H. Evans, a former New York investment officer, has carried on since Jan. 5 as chief of the pulp allocation office, with Kiev Larson, sales manager of the Weyerhaeuser Timber Co.'s pulp division, as his consultant.

OPA-WPB Cooperation

One of the important trends since the coming of Mr. Wilcox has been the closer relationships between WPB and OPA. They are now a smooth running team.

Relaxation of price controls and future OPA policy were discussed

at a closed meeting April 18 of a newly formed over-all pulp and paper industry advisory committee. The meeting was held at the headquarters of the Pulp and Paper Products Price Branch of OPA, headed by J. Ronald Atwater, formerly of Mead Corp. The members of the new committee are:

H. S. Daniels, Union Bag & Paper Corp.; Grafton Houston, Fort Howard Paper Co.; Malcolm Lowe, Lowe Paper Co.; John L. Riegel, Riegel Paper Corp.; Harold Smith, Maine Seaboard Paper Co.; H. R. Weaver, International Paper Co.; Vasco E. Nunez, Nashua Gummed & Coated Paper Co.; W. J. Dixon, St. Regis Paper Co.; V. C. Hobbs, Fibreboard Products Inc.; Rex Hovey, Oxford Paper Co.; W. Irving Osborne, Cornell Wood Products Co.; Arthur Schroeder, Pejepscot Paper Co.; D. L. Stocker, Michigan Paper Co. of Plainwell; J. D. Zink, Strathmore Paper Co., and J. D. Zellerbach, Crown Zellerbach Corp.

Although the meeting was a closed one, members have indicated to PULP & PAPER INDUSTRY that it appears that Chester Bowles, OPA chief, meant it when he said that his staff "will rely heavily on recommendations of industry advisory committees." But it is also apparent, as predicted in the April issue (page 11) that some advice will also be received by the advisory committee. However, it is expected that when supply balances demand, OPA will lift ceilings, item for item, as the balance occurs. Whether there might be limited relief for book, fine and kraft papers, was still not clear in mid-1945.

Laurence M. Channing carries on as chief counsel of the OPA pulp and paper group. Maurice Walsh is head of paper products; Philip A. Bachelder, head of fine and printing papers, and Harrison Starr, head of raw materials.

Members of the overall paper industry advisory committee for the WPB, which held its last meeting under chairmanship of Mr. Wilcox on March 13, in the Social Security Bldg. in Washington (See map on page 26) are:

William Anders, Nashua River Paper Co.; Ralph M. Beckwith, Crocker, Burbank Papers, Inc.; D. K. Brown, Neenah Paper Co.; R. M. Buckley, Soundview Pulp Co.; D. G. Driscoll, Sorg Paper Co.; D. C. Everest, Marathon Corp.; Roy K. Ferguson, St. Regis Paper Co.; W. K. Gerbrick, Central Paper Co.; Grafton Houston, Fort Howard Paper Co.; D. S. Leslie, Hammermill Paper Co.; Clyde B. Morgan, Eastern Corp.; Vasco E. Nunez, Nashua Gummed & Coated Paper Co.; Cola G. Parker, Kimberly-Clark Corp.; John L. Riegel, Riegel Paper Co.; H. S. Smith, Maine Seaboard Paper Co.; D. L. Stocker, Michigan Paper Co. of Plainwell; J. H. Hinman, International Paper Co., and J. D. Zellerbach, Crown Zellerbach Corp.

It will be noted, in comparing this list with the OPA counterpart publihsed in this article, that there are a number of duplications. There are other advisory committees and the government's tendency seems to be to call on certain individuals for quite a bit of their time, instead of spreading the work out as much as might be hoped for.

This WPB advisory committee was given a somewhat discouraging picture of the pulpwood prospects, in view of labor, equipment and transportation bottlenecks.

Foreign Policy

The FEA paper, lumber and container section, is headed by Arthur Bevan, who comes from the west coast, and has offices in Temporary U Bldg.

Purchasing commissions from liberated countries has presented as "requirements" from North America, a total of 300,000 tons of wood pulp and 121,00 tons of paper in 1945. FEA cut this sharply. And the Forest Products Bureau, in turn, took a sharp cut at the FEA figures. Policy now is to serve Europe's needs from northern Europe, especially Sweden, and hold U. S. shipments to a minimum.

However, John W. Fuchs, State Department expert on pulp and paper, has taken the position that pulp and paper for liberated countries is a matter of foreign policy which need not be divulged. Only some persistent inquiries from the Congress has brought out what little information has been revealed.

General Situation

In general, however, it is a far cry from the old days when the Pulp & Paper Division was going through a period of trial and error, when essentiality of the industry was appreciated by neither the government nor the public, and all manner of suspicions were afoot in Washington. Much credit is due the earlier personnel who struggled through those days.

The War Manpower Commission has gone on record to lift all manpower controls except in a few critical areas, after V-E Day. OPA is on record to remove ceilings as quickly as practicable. WPB is on record to lift many of its controls. The question now is — how soon after V-E Day? On May 1, President Truman wrote the Director of the Office of War Mobilization and Reconversion, urging war agencies not to disband their trained staffs after V-E Day.

It is assumed in most quarters that he meant, of course, not too soon after V-E Day. But the President's letter said, in part: "These agencies cannot afford to relax their efforts or to disband their trained staffs . . . we still have a tremendous job ahead in bringing the entire war to a victorious conclusion. Beyond that, we must reconvert our domestic economy to the production of peacetime goods and services. The tasks which lie ahead are no less urgent, no less important, no less vital to the future stability of our free institutions than the tasks behind us." The President requested Director Vinson to write the head of each agency, asking him to canvass the key personnel, informing him of the presidential request that the key workers stay on the job.

Canadian Controls--

CANADA's pulp and paper industry, geared to a wartime pitch for six years, probably will continue under a certain measure of government control for many months after the war in Europe.

A majority of the operators feel that the present system of control has not only been effective but has done a good job in coordinating production and distribution at a time when there was vital need for cooperation of all interests involved in the industry.

From the outset of war Canada has recognized the important economic part played by the pulp and paper industry, and for that reason the government has been careful to impose restrictions only to the extent of giving the industry as a whole its maximum opportunity for wartime production.

There has been pro-rating of individual mills' output and in eastern Canada there has been a close check on waterpower consumption due to the needs of other essential industries such as aluminum, for instance; and there have been the inevitable controls over new construction, provision of new equipment and so on. But most people will agree that

H. R. MacMILLAN (left), who launched Canada's wartime Timber Control set-up, and A. H. WILLIAMSON (below), who has headed it for the past two years. Mr. MacMillan's reports on timber stands are discussed in the preceding article in this issue on Canadian timber resources.

whatever regimentation has been imposed in Canada has been for the good of the industry as a whole and that few, if any, individual operations have seriously suffered.

The most serious bottlenecks have been in the supply of raw material and that situation has been due almost wholly to shortage of manpower both in the west and in the east, and in the east there has been the additional difficulty of seasonal water shortages in the rivers that have at times prevented the free movement of log drives to the mills.

But, by and large, the chief handicaps to production have been beyond control of the government, even though there has been intermittent criticism by leaders in the industry concerning the allocation of manpower. During the past two years, however, the government through its National Selective Service organization has assisted in developing new regional sources of labor. Efforts have been made to encourage more part-time woodsmen to work for the pulp and paper operations in Quebec and Ontario and in the latter province large numbers of German prisoners of war have been employed in woodcutting, while in British Columbia several hundred Japanese evacuated from the coast have been cutting jackpine for one mill.

There has already been a noticeable relaxation in controls over provision of building materials and new equipment so that several companies have been able to initiate expansion programs. This tendency will probably increase from now on.

Probably the major deterrent to future development of the pulp and paper industry in Canada, however has been the unsettled taxation situation. High wartime taxes have prevented many of the companies to build up the necessary reserve for carrying out new construction long contemplated, and during the coming months the industry may be expected to press for clarification of the tax riddle and relief from the present onerous imposts.

The Men At Controls

The Timber Control organization, first launched for the government by Vancouver's H. R. MacMillan, has been headed up at Ottawa for the past two years by A. H. Williamson, another British Columbia man, who, however, has indicated his intention to resign from that post in the near future. D. D. Rosenberry, assistant timber controller in charge of British Columbia activities, recently went to Ottawa to join Mr. Williamson's staff. Jack Lamprey and Hec Munro, also of Vancouver, are in charge of the other important divisions of Timber Control at Ottawa. Controller of all building in Canada is another Vancouver man, Lieut.-Colonel John Peter Mackenzie, who authorizes all permits for new construction in the industry.

Timber control as well as almost every other Canadian department dealing with the sale of forest products come within the over-riding jurisdiction of the Wartime Prices and Trade Board, headed by able, tough-minded Donald Gordon, who usually has the last word on such questions as pulp and paper prices and pro-rating of production and distribution. His boss is Hon. J. L. Ilsley, Canada's minister of finance, who has probably had more to do than anyone else in keeping the brakes on inflation in Canada.

The Association

All these officials are in Ottawa, but Montreal is still headquarters of the pulp and paper industry, and in the Quebec metropolis are Newsprint Administrator Guy Hoult, assisted by David G. Stenstrom, another westcoaster. All of Canada's 25 newsprint mills are under strict production quotas, a pro-rating of available business.

Pulpwood Exports

On the west coast the export of pulp logs to the United States has been under strict control in recent years and the Timber Control has been authorizing export of about 32,000,000 feet annually, compared with more than 100,000,000 feet in 1939 and in 1940 before wartime restrictions were applied.

Pulpwood exports from eastern Canada to the eastern states have been maintained in fairly heavy volume, and this movement, too, has been under control since 1942, when arrangements were made whereby the United States mills which normally depended on Canadian wood receive enough to meet their ordinary requirements. Exports of pulpwood from eastern Canada reached a new high in 1942, with 1,987,750 cords valued at $20,314,253. In the following year these exports declined in volume to 1,540,592 cords and in value to $18,565,265. The value of woodpulp shipments in 1944 to the United States were up again to $20,012,000.

MOST RECENT PHOTOGRAPH OF THE EXECUTIVE COMMITTEE OF AMERICAN PAPER & PULP ASSN. In this picture of recent meeting are the president, ten vice presidents and other officials of the organization.

Sitting (left to right): GEORGE R. WALLACE, Pres. and Treas., Fitchburg Paper Co.; J. D. ZINC, Pres., Strathmore Paper Co.; COLA G. PARKER, First Vice Pres. of APPA and Pres., Kimberly-Clark Corp.; J. L. MADDEN, Pres., Hollingsworth & Whitney Co.; DAVID L. LUKE, Jr., Pres., West Virginia Pulp & Paper Co.; STUART E. KAY, Manager of Manuf. Dept., International Paper Co., and R. A. McDONALD, Exec. Vice Pres., Crown Zellerbach Corp.

Standing (left to right): J. L. RITCHIE, Asst. Sec'y, APPA; E. W. TINKER, Exec. Sec'y, APPA; DWIGHT L. STOCKER, Pres. and Gen. Mgr., Michigan Paper Co. of Plainwell; P. H. GLATFELTER, Pres., P. H. Glatfelter Co.; W. W. CORLETT; W. J. DIXON, Vice Pres. and Sec'y, St. Regis Paper Co., and DAN K. BROWN, Pres. of APPA and Pres. and Gen. Mgr., Neenah Paper Co.

Industry Associations in U. S.

While the problems of the associations cannot be said to have multiplied in numbers this year (they began to multiply at the very beginning of the war) these same problems have certainly toughened in fiber.

Victory in Europe saw the dawning of happier days for association members and personnel, but also it witnessed the birth of new problems of peace-time operations here and of puzzles created by the industry's inevitable contribution to reconstruction abroad.

One of the most interesting changes during 1944 and thus far in 1945 has been the gradual—until it is almost complete—acceptance of associations in the Washington scene. It is violating no confidence to say that early in the war the associations were almost unwelcome in the capital. Agency officials showed a marked tendency to prefer to work with individual companies. But there came a realization that the associations, after all, were truly representative of their memberships and that much time and effort could be saved on both sides by acceptance of the organizations on both general and specific matters. This acceptance grew parallel with the eventual smooth functioning of WPB's Paper Division, the OPA, the Department of Commerce, and the gradual improvement of the wartime functions of the associations themselves.

Biggest worry of associations representing producers is right now the tariff question. They have long been aware that the end of the war would see swift agitation for a change in tariff structures. Since the passage of the first tariff act in 1879 the U. S. paper makers have enjoyed a reasonable protection against foreign competition. But much has happened since then, as the reader well knows. The terrific demands for pulp and paper, which can even be sharpened rather than lessened by victory, and the strong political trend of the "One-World" school, are bound to affect the vision of those under whose scrutiny tariff revisions have come.

APPA

The American Paper & Pulp Association, as well as other organizations, are alert to the possibilities. They have, through the Import Committee, a complete record of tariff history and developments, and they are even now presenting well-documented evidence to support the position recommended by the executive committee.

Last August the AP&PA, whose executive secretary is hard-working E.W. (Ted) Tinker, issued its "Current Work Program" and so complete and prophetic was this outline that there has been little or no departure from it since that time. Significantly, the program led off with the problem of forest utilization, and pointed out the place of the Forest Industries Council, a group of nine representing the major forest products industries and growing in importance every week in the current picture. A chief project is a detailed study of timber valuations and taxation.

Work went forward on basic labor problems, including relationship with the government labor agencies, and stress was laid as usual on technical problems. In the latter connection, 1944 saw the culmination of plans for the National Council for Stream Improvement which last May established a multiple indus-

D. K. BROWN (Neenah Paper Co.), now serving second term as President of American Paper and Pulp Assn., who this month testified in behalf of industry at Congressional hearing on reciprocal trade agreements.

trial fellowship in the Mellon Institute.

TAPPI and Supts.

Much of the work on technical problems was carried through TAPPI which, as always, prepared and coordinated a vast amount of technical material under the leadership of its long-time secretary-treasurer, R. G. Macdonald. TAPPI, like all the associations, was considerably hampered this year by the government ban on national conventions. Its program that normally would have been crystallized at New York was followed as nearly as practicable through small regional meetings and by mail. It is believed that next year will see the convention ban lifted at which time back-logs of agenda will mean tremendously filled programs for the national conventions of all associations.

Last year the American Pulp & Paper Mills Superintendents' Association moved its headquarters from Miamisburg, Ohio, to 220 West 42nd Street in New York City, and George W. Craigie took on the double job of field representative and secretary-treasurer. It carried on two important surveys, one of them dealing with the amount of equipment to be installed postwar by plants in which members were represented. The two surveys were to have formed the basis of action at a convention, but of course this has had to be delayed. It is expected, however, that the executive committee will meet in New York in June and consider further moves.

Pulp Producers and Users

The Association of Pulp Consumers did yeoman work in Washington for its members through C. V. Maudlin, the secretary in the Mills Building at the capital. And the American Pulpwood Association, whose executive secretary-treasurer is H. E. Brinckerhoff, continued to bear down on the great problem of pulpwood supply and to collect and issue statistics relative to that problem.

Toughest assignment in all the industry for the past few years has been the furnishing of pulp supplies, and thus the United States Pulp Producers Association, under the direction of its executive director, well known and able Oliver M. Porter, bore the brunt of a lot of headaches. A big problem in this association is trying to harmonize viewpoints of western pulp producers and the eastern integrated mills.

The associations thus far named worked in extremely close cooperation throughout the period of the European war and are working closely now. Almost no major enterprise was undertaken without reference one to the other, and in many projects the action was a joint one. Cooperation, among themselves, and with the government agencies, has been the watchword.

Although the banishment of national conventions and the elimination of New York's famed "Paper Week" took the spotlight away from many associations and decreased their publicity, other organizations were hardly less active. The Blotting Paper Manufacturers Association, the Book Paper Manufacturers Association carried on active programs, as did the National Paper Trade Association, and the Groundwood Paper Manufacturers Association.

JOHN H. SMITH (Hawley Pulp & Paper Co.), President of Pacific Coast Association of Pulp & Paper Manufacturers, who led his organization into 13th annual renewal of wage negotiations with AFL unions at Portland, Ore., May 22.
These negotiations each year have been outstanding models of amicable and successful collective bargaining for all major industries of the entire U. S.

There are now more than thirty associations operating nationally within the industry and despite the heavy burdens imposed by war demands they have performed their duties well. If there was ever a thought that the war and the development of highly organized government agencies would displace the functions of associations, the events since 1940 have dispelled that thought. They have emerged stronger and more experienced.

Industry Associations in Canada

In Montreal are the principal offices of the Canadian Pulp and Paper Association and of the Wood Pulp Supply organization, managed by W. A. E. Pepler, of the Quebec Forest Industries Association. The Newsprint Association of Canada is also located in Montreal.

Recently appointed as president of the Canadian Pulp and Paper Association is Robert MacLaren Fowler, with A. E. Cadman, longtime secretary, as general manager.

Charles Vining is president of the Newsprint Association of Canada, with Paul Kellogg general manager and E. Cunningham, secretary. Mr. Vining was first chairman of the Joint Executive Board set up last fall by the industry as a whole. Mr. Fowler was elected April 27 as the new chairman for 1945-46. W. H. O'Reilly is secretary of the Joint Executive Board.

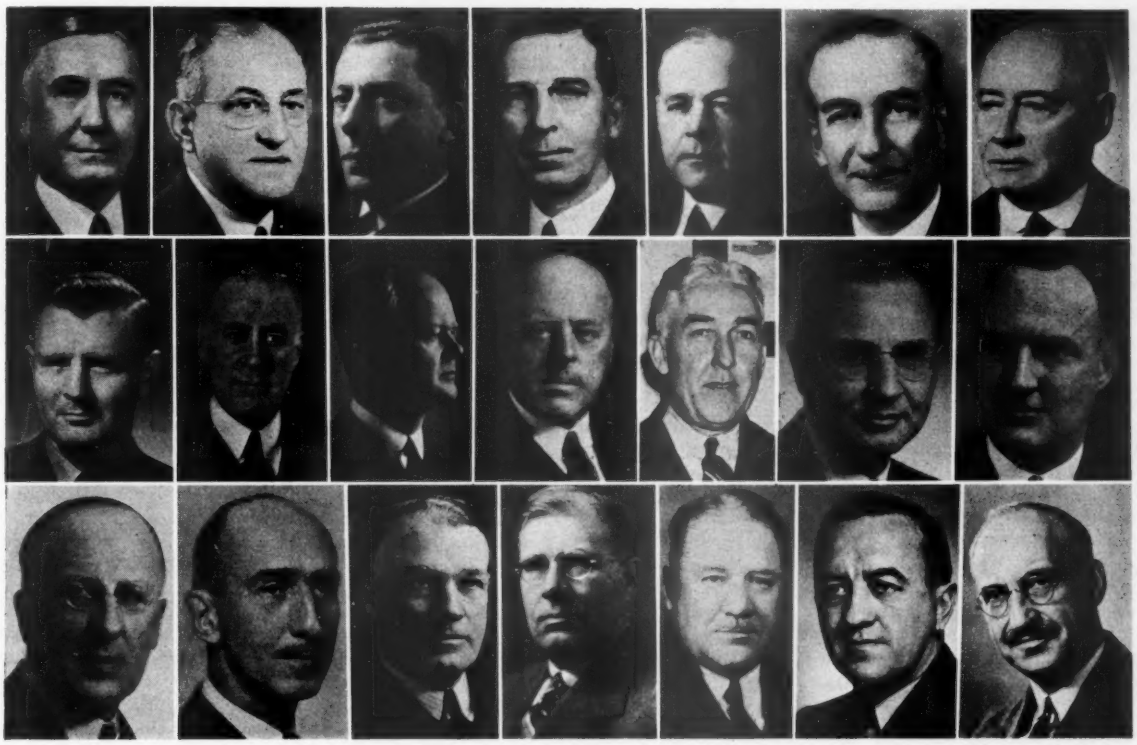
Chief departmental officials of the Canadian Pulp and Paper Association are Douglas Jones, secretary of the technical section, and A. Koroleff, manager of the woodlands division.

Chairman of the executive board of Bathurst Power & Paper Association is R. L. Weldon, president

of Bathurst Power & Paper Co., with the following as members of the association's executive: George Barber, Spruce Falls Power & Paper Co.; G. L. Carruthers, Interlake Tissue Mills; W. S. Kidd, E. B. Eddy Co.; E. M. Little, Anglo-Canadian Pulp & Paper Mills; F. G. Robinson, Riordan Sales Corporation; J. A. Young, Pacific Mills, special senior vice-chairman, Charles R. Whitehead, Consolidated Paper Corporation.

Members of the industry's Joint Executive Board representing the entire industry are: L. J. Belnap, Consolidated Paper Corp.; George W. Brown, Gair Co. of Canada; A. E. Cadman; G. L. Carruthers, Interlake Tissue Mills; G. T. Clarkson, Abitibi Power & Paper Co.; Paul E. Cooper, Pacific Mills; Aubrey Crabtree, Fraser Companies; Harold S. Foley, Powell River Co.; G. Gordon Gale, E. B. Eddy Co.; John H. Hinman, Canadian International Paper Co.; Col. C. H. L. Jones, Price Bros. & Co.; Paul Kellogg; Robert P. Kernan, Donnacona Paper Co.; E. M. Little, Anglo-Canadian Pulp & Paper Mills; F. G. Robinson, Riordan Sales Corp.; J. P. Rolland, Rolland Paper Co.; C. H. Sage, Spruce Falls Power & Paper Co.; E. Howard Smith, Howard Smith Mills; Charles Vining; R. L. Weldon, Bathurst Power & Paper Co.; A. F. White, St. Lawrence Corp.; C. R. Whitehead, Consolidated Paper Corp. and Mr. Fowler.

R. M. FOWLER, President of Canadian Pulp & Paper Assn., who was elected April 27 in Montreal as new Chairman of the Joint Executie Board for Canadian industry.



BOTH A SYMBOL AND A WORKING DEMONSTRATION OF THE NEW SPIRIT OF UNITY now prevailing in the Canadian industry is the Joint Executive Board created last winter to serve when required as a representative body of the whole industry in matters common to the two trade associations—the Canadian Pulp & Paper Assn. and the Newsprint Assn. of Canada.

CHARLES VINING (at left), President of the Newsprint Assn. of Canada, was first Chairman of the Joint Board. Other members are:

Top Row—L. J. BELNAP, President, Consolidated Paper Corp.; GEORGE W. BROWN, President and Gen. Mgr., Gair Co. of Canada; AUBREY CRABTREE, President and Gen. Mgr. Fraser Companies; F. G. ROBINSON, President, Riordan Sales Corp.; J. P. ROLLAND, Vice Pres., Rolland Paper Co.; C. H. SAGE, President, Spruce Falls Power & Paper Co.; C. R. WHITEHEAD, Vice Pres., Consolidated Paper Corp.

Middle Row—G. L. CARRUTHERS, Asst. Gen. Mgr., Interlake Tissue Mills Co.; ROBERT P. KERNAN, President, Donnacona Paper Co.; A. F. WHITE, Chairman, St. Lawrence Corp.; G. GORDON GALE, President, The E. B. Eddy Co.; HAROLD S. FOLEY, President, Powell River Co.; R. L. WELDON, President, Bathurst Power & Paper Co. (and Chairman of the CPPA); PAUL E. COOPER, President, Pacific Mills.

Bottom Row: A. E. CADMAN, Sec'y.-Mgr., Canadian Pulp & Paper Assn.; HOWARD SMITH, Vice Pres., Howard Smith Paper Mills; JOHN H. HINMAN, President, Canadian International Paper Co.; PAUL KELLOGG, Gen. Mgr., Newsprint Assn. of Canada; COL. C. H. L. JONES, President, Price Bros. & Co.; E. M. LITTLE, Gen. Mgr., Anglo-Canadian Pulp & Paper Mills, and W. H. O'REILLY, Secretary of the Joint Executive Board. The photograph of one remaining member, G. T. CLARKSON, Receiver and Mgr., Abitibi Power & Paper Co., was not available.

TIMBER RESOURCES OF THE
The Trend Is Toward a Balance of D

CANADA—Pulpwood Logs as far as eye can see at La Tuque, St. Maurice River, Quebec, where Brown Corp. operates.

COMMERCIAL use of the North American forests goes back to the days of Lief Ericson, who in 1,000 A. D., took spruce from the northeastern coast back to his Viking colony in Greenland.

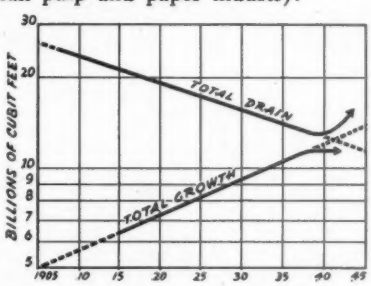
The forests have made an immeasurable contribution to the advance of civilization—spiritually and materially. For example, what would freedom of "speech" be, without pulp and paper? In the present World War, the government, the press and the general public have learned—the hard way—just how important pulp and paper is to the successful waging of war as well as to the general economy.

Let us hope none of them—government, press and public—will forget the lesson in the years of peace that lie ahead, and that they will give encouragement to a vital North American pulp and paper industry.

In view of the amazing mass of contradictory and alarming reports—mostly sheer gossip—which have circulated in recent years concerning the forest resources of the continent, PULP & PAPER INDUSTRY has made a critical study of the most reliable available facts and information.

This study indicates that if present progressive and far-sighted policies of many big forest-utilizing industries are adopted generally in those fields, and encouraged by government action liberalizing taxation and other restrictions, there is not the slightest doubt that the forests of the United States—as well as those of Canada and Alaska—will continue to have increasing economic value and usefulness for at least another thousand years.

As we approach the millenium of Lief Ericson's spruce-logging expedition, we are on the threshold of an era of intensified use of the forests. Such an era as we are approaching was only a dream just a few years ago. Cultivation of timber for industrial purposes, increasing the total wood utilization in manufacturing, should soon be firmly established on this continent. It will take cooperative effort on the part of government, the forest services and general public—as well as industries—but the growing of timber as not only a stabilized, but an increasing source of material for wood-utilizing industries is just over the horizon.



TRENDS OF GROWTH AND DRAIN IN U. S. FORESTS

This chart shows how trends revealed in Forest Service data (Capper Report, 1920; Copeland Report, 1924-29; 1936 Survey) were heading toward a balance of growth and drain by 1941-42. However, the war intervened and abnormal demands turned the drain line upward and probably temporarily leveled off the growth line. Dotted lines show what probably would have happened if there had been no war.

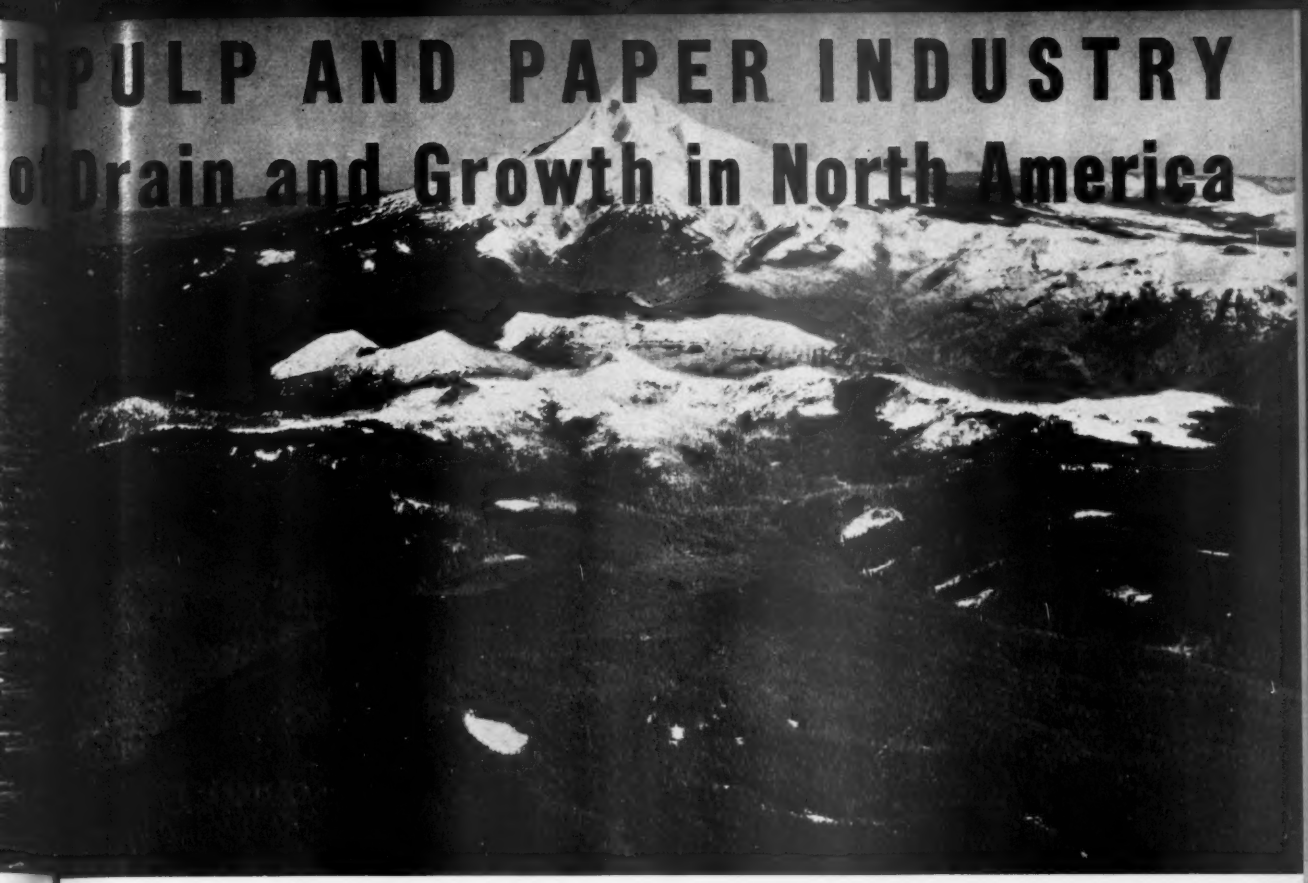
Reasons for Optimism

What grounds is there for such optimism?

Well, in the first place, virtually the only statistical data available on North American forest resources have been periodic surveys by the U. S. and Dominion Forest Services. By its own calculations, the U. S. Forest Service figures over a period of 25 years shows that trends of growth and drain are toward a balance—and eventually, a growth that steadily exceeds drain.

If it were not for the World War's intervention, bringing with it

HE PULP AND PAPER INDUSTRY
of Drain and Growth in North America



UNITED STATES—Vast expanse of timber in virgin stands spreads out for miles below Mount Hood, Oregon.

tremendous above-normal demands for sawtimber and also tremendous wastefulness in logging and manufacturing, because of haste as well as the manpower shortage, this balance might have already been attained.

In a pre-war year, the U. S. Forest Service's last nationwide survey showed that if loss in forest fires and ravages of insects and diseases were eliminated, a balance of growth and drain would have already been attained. Of importance to the pulp and paper industry is the fact that this fire-insect-disease loss was proportionately much greater in the "cordwood" trees than in so-called sawtimber.

Probably one of the best reasons for optimism is tht evidence that growth rates on the continent are increasing rapidly as more old timber is taken off. About 100 million acres of old timber areas in the U. S. have no net growth whatever at the present time.

In most of Canada and Alaska, whose vast stands of virgin timber and resources for industrial use are discussed in articles which follow this one, there is no emergency existing.

Sources of Material

In the tables and other data used in this article, we have drawn primarily from U. S. Forest Service files. No responsible persons have questioned the accuracy of the Forest Service, or at least its endeavors to be accurate. However, in any consideration of forest resources in this country, it would be less than honest to overlook the fact that certain influences have in the past sought to use Forest Service information for propaganda purposes. When "causes" are being served, there is always doubt cast upon the kind of statistics which are presented—or what statistics may be omitted. It's an old saw that statistics can be found to prove anything.

The Forest Service is presently undertaking, at the request of the White House, a re-survey of the various forest regions with a view of developing data to determine to just what extent it will be possible for this country to supply lumber to Europe.

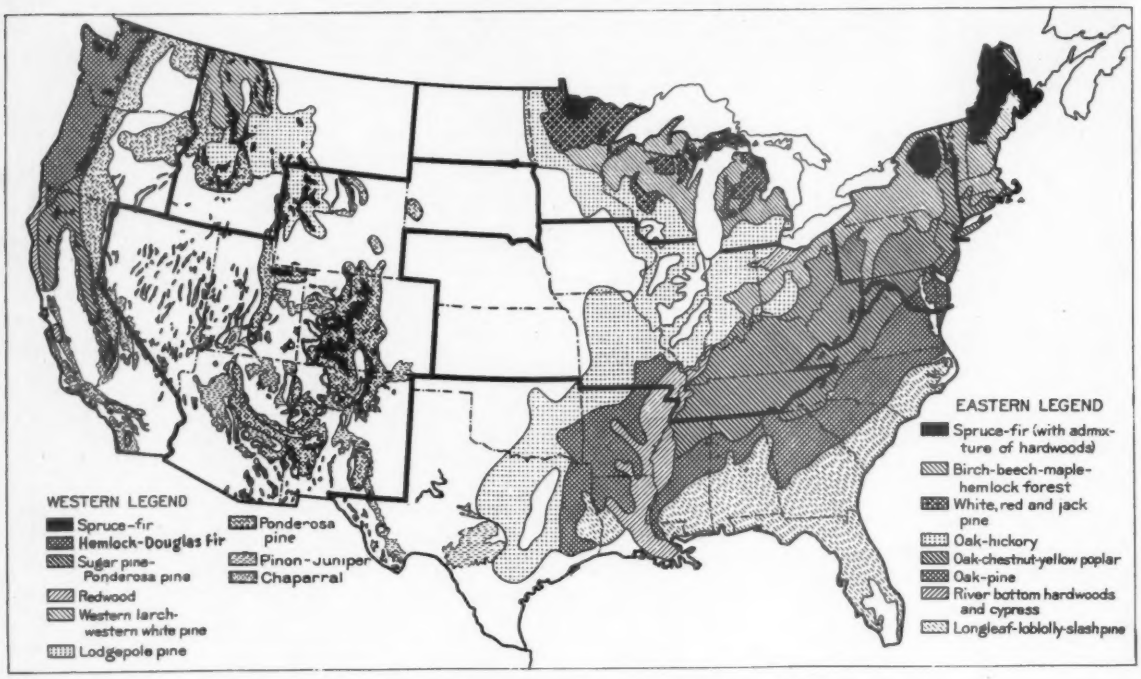
In fairness to the Forest Strvice. it should be pointed out that lack of manpower and facilities, especially in these war years, have made it impossible for thoroughgoing surveys, although data for the Pacific Northwest, published in this issue, have been brought up-to-date Incidentally, with more manpower available after the war, control of fires, tree-planting, and more efficiency in logging and manufacturing will be possible.

The American Forestry Association has a survey of forest resources which is only partially completed and the forestry committee of the American Paper and Pulp Association has tried to collect data on resources of the industry. We have drawn from all of these sources in attempting to make a just appraisal of the situation in this article.

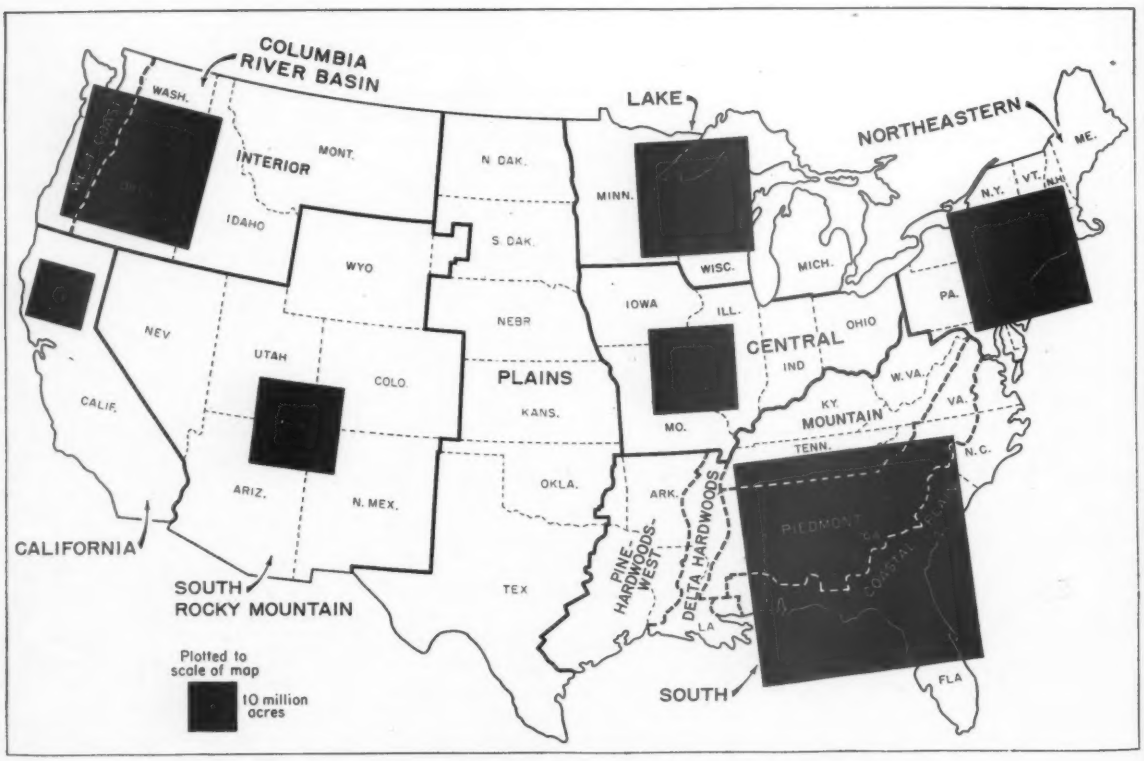
There is no doubt that heavy cutting in war years has raised a critical problem in most areas of the U. S. This is reflected in up-to-date statistics of pulpwood species in Pacific Northwest states (much of it used for lumber), published with this article. But wartime cutting has been so abnormal that, in itself, it is no fair basis for consideration of the future. The government and the public in general should take that fact into consideration when the present nationwide surveys are completed.

A "Fair" Estimate

The office of the Chief Forester. U. S. Forest Service, has indicated that it does not view the high drain rate shown in Pacific Northwest



PRINCIPAL FOREST TYPES AND THEIR LOCATIONS IN U. S.
(From the Statistical Bulletin of U. S. Department of Agriculture.)



COMPARATIVE SIZES OF COMMERCIAL FOREST AREAS IN U. S.
(Compiled by Division of Forest Economics, Forest Service, U. S. Dept. of Agriculture.)

data published here as uniform throughout the nation. In fact, it holds that drain and growth are fairly equal in the eastern areas. In the Montana - Idaho - Eastern Washington region, the regional Forest Service officials expressed the opinion that drain and growth have balanced.

"In view of the close relationship of growth and drain in the eastern areas," PULP & PAPER INDUSTRY was informed at the office of the Chief Forester, "a pretty fair picture of present stands may be presented by combining the 1938 data for the rest of the country with the 1945 revision for Pacific Northwest states." (These tables both appear with this article.)

There are a number of large and important units of the pulp and paper industry which today can claim, on sound grounds, that they have their timber holdings on a perpetual yield basis. Even in wartime this has been possible. The recovery for forestry culture of extensive areas in the South has been a remarkable development in recent years. What the industry will be able to do along this line when it has the manpower should be a reassuring thought to any doubting Thomases.

Economic Influences

Here are some economic reasons why the pulp and paper industry should look forward to a general over-all improvement of their position in relation to forest resources:

1. The value of wood is rising and this should encourage the growing of wood as a business by small and large landowners.

2. Hydraulic log barking on the Pacific Coast probably will save 450,000 cords of wood annually in pulp mills, and many thousands more cords in sawmills. Greatest engineering development of the war period in the industry, it has been installed already in five big mills in the west; in a matter of weeks two more will be on the list, and eventually most big sawmills and pulp mills in Oregon, Washington and British Columbia will be saving up to 20% of their wood by this method.

3. Closer utilization is being made of wood in all regions of the continent, by more efficient operations and the development of commercially feasible by-products. If only 10% of present substantial wood waste is eliminated, it would effect an actual saving of 60 million acres of forests annually in the U. S. (total forest land is reckoned at 600,000,000 acres).

4. Use of wood for fuel has gone down sharply in the past quarter century and will continue downward as the use increases of materials easier and cleaner to handle and with greater heat value.

5. Use of wood by sawmills, shingle mills and for lath and cooperage has been downward except for the war period spurt, which, however did not reach levels of 30-40 years ago. (All timber cut for commodities totaled 20 billion cu. ft. in 1907. In 1936, it totaled only 11.4 billion cu. ft., down 43%). Pulp, paper, plastics, glass, iron, steel, tin, clay and plaster have replaced many wood uses.

6. New commercial values have been discovered for many less common wood species, smaller wood and so-called "weed" species, which have never been calculated in forest re-

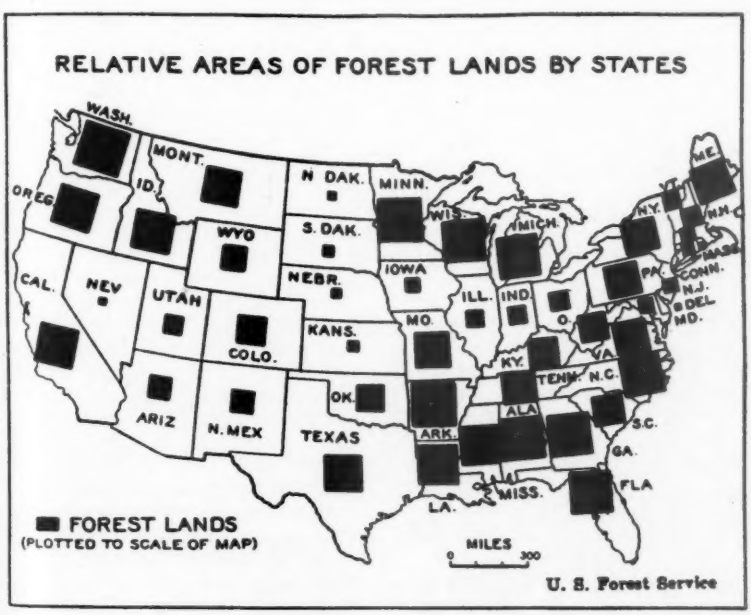
U. S. STAND OF PRINCIPAL SPECIES NOW COMMONLY KNOWN IN PULP AND PAPER MANUFACTURE

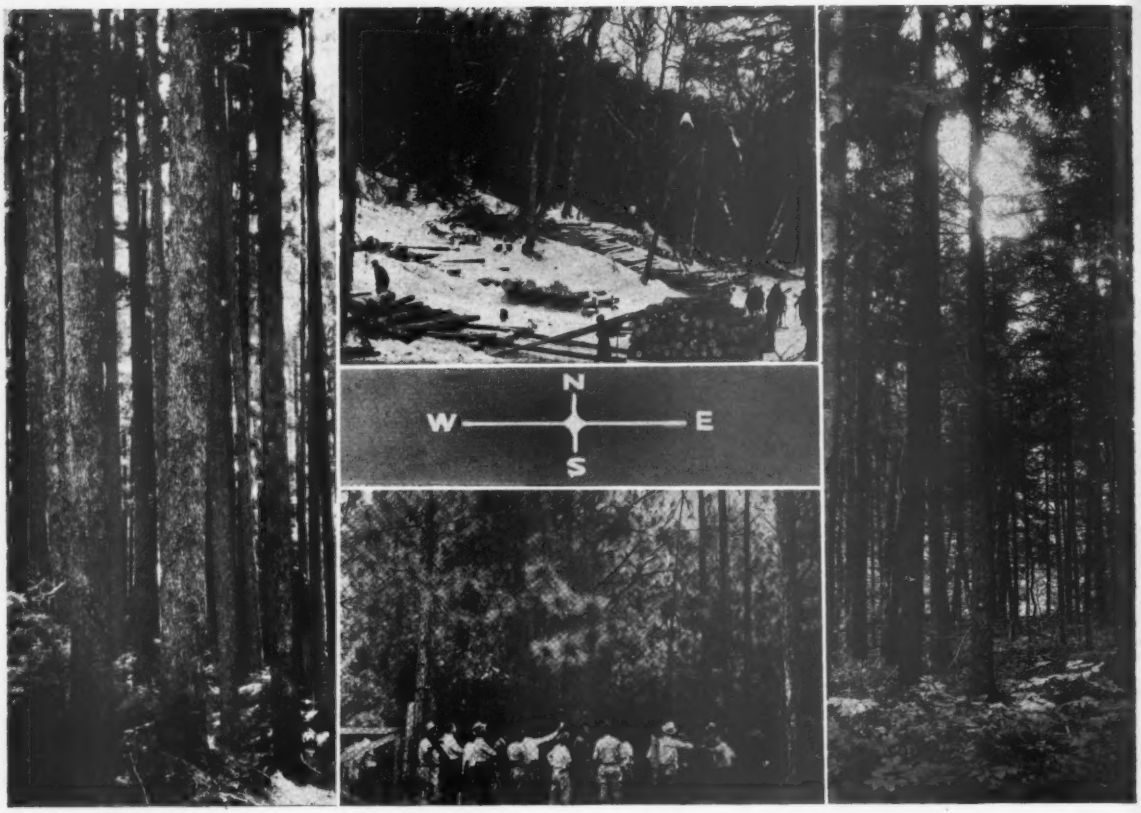
Kind of Wood:	Total	North-eastern	Central	Lake	South	Pacific Northwest
		(thousand cords)				
Softwoods:						
Spruce and Fir[1]	542,314	50,961	.....	29,997	1,400	248,593
Hemlock	330,288	19,567	59	33,774	9,800	267,088
So. Yellow Pine	630,795	8,751	1,993	.....	620,051	.....
Other Pines	78,534	38,765	18	35,567	4,184	.....
Tamarack	3,093	14	.....	3,079	.....	.....
Total	1,585,024	118,024	2,070	102,417	635,435	515,681
Hardwoods:						
Cottonwood[2]	66,118	12,342	892	43,776	5,614	3,221
Yellow Poplar	49,917	3,490	996	.....	45,431	.....
Birch[3]	296,383	183,816	10,355	88,162	14,050	.....
Gum	249,685	2,601	1,967	.....	245,117	.....
Total	662,103	202,249	14,210	131,938	310,212	3,221
All Species	2,247,127	320,307	16,280	234,355	945,647	518,902

[1]Total includes 104,034 thousand cords in California and 107,329 thousand cords in South Rocky Mt. region. [2]And Aspen. [3]And Beech and Maple.

Source: U. S. Forest Service, 1936-38 Revision.

The Forest Service calculated a balance of drain (after allowance for growth) of 5.7% in 1936. If this were taken as an average for each year since then, the above total for all species in 1936-38 would be reduced to 2,126,818 thousand cords in 1945-7. However, as this article explains, there are many reasons why the 1936 drain figure cannot be accepted as average. Both growth and drain increased in war years, but drain undoubtedly will be reduced substantially in postwar years while the growth rate increases. (1945 Forest Service revisions for the Pacific Northwest, in another table, show the available pulp species in that region since 1936. During the war emergency, the government required much of this timber for lumber and the drain ratio to growth was far above the national trend.





PULPWOOD OF NORTH AMERICA. North—In Canada, where pulplogs are hauled on sleighs by trucks. South—Farmers at a cutting demonstration, learning economics of forestry. East—A pulpwood scene in eastern United States. West—A stand of Western Hemlock in Washington state.

sources. Many of these developments have been in the pulp and paper field. Hardwoods in New England and New York and jackpine in Canada, for example, have become valuable pulping species by the perfection of new processes, thus opening up for use great stands of timber.

7. Use of resins, etc., have given utility to low grade materials, tree tops, branches and other waste — even sawdust. Resins and coating make possible saving of much wood fiber by—in effect—substituting for it. It makes lightweight paper and thin plywood serve heavy paper or wood uses.

8. As previously mentioned, availability of more manpower after the war will make possible a sharp upswing in tree planting and cultivation, forest fire protection, etc. Some of the best-informed and most conservative woodlands industry officials in the South say adequate fire protection is all that is needed to put that entire area on a perpetual yield basis.

9. Developmetn of new mechanical equipment for the woods operations, especially lightweight equipment in the west, will make it economical and less difficult to bring out of the woods all of the raw material.

10. Many areas in the United States that were cleard for farming, have been found better suited for growing timber. In these areas where farmers have failed, the land is going back to its original purpose. It doesn't take much effort to grow trees where they were meant to grow. There are such areas in as widely separated areas as Washington, Wisconsin and some Southern states.

Forest Service Goal

The Forest Service, in reporting new growth in the U. S. of 11,287,000,000 cubic feet in 1938, proposed a national goal almost twice as great—21,400,000,000 cubic feet of annual new growth. Perhaps it wouldn't take much to make even this figure seem small.

For instance, according to State Forester Anderson in Louisiana, that state now has 1,750,000 acres of land growing pulpwood. In Southwestern Louisiana, he informed PULP & PAPER INDUSTRY there are approximately 1,000,000 acres of cut-over long leaf land in need of artificial reforestation. There are other states where timber cultivation could easily be doubled.

A trend of the past 40 years which should be reviewed and closely studied by public officials and the general public has been the steady acquisition of some of the best forest areas by the governments for parks, national forest or state reserves. No public-spirited person would question the right to take over such areas as have scenic or recreational value, but in many cases this is questionable.

t would seem more constructive for governments to devote their attentions and funds to unproductive lands, reclaiming areas for timber which private companies probably could not afford to invest in. This has been the purpose of the Weeks law in the U. S., under which 20,000,000 acres have been acquired over more than 30 years.

Industry Gets Together

A significant move by private enterprise has been the formation of the Forest Industries Council with P. H. Glatfelter, president of P. H. Glatfelter Co., operators of soda pulp and book paper mills at Spring

U. S. CONSUMPTION OF DOMESTIC PULPWOOD

(By Regions—In Cords)

Year—	Northeast	Appalachian	Lake States	Pacific Coast	South	Total
1941	2,210,000	1,354,000	1,509,000	2,851,000	6,090,000	13,743,000
1942	2,192,000	1,428,000	1,928,000	2,612,000	6,320,000	14,480,000
1943	1,858,000	1,277,000	1,356,000	2,444,000	6,166,000	13,100,000
1944	1,915,000	1,448,000	2,123,000	2,560,000	6,744,000	14,819,000

Source: U. S. War Production Board.

Grove, Pa., as chairman. Producers of over two-thirds of all U. S. forest products have crossed industry lines for the first time and joined forces to encourage forest growth. A meeting last month in New Orleans was participated in by all pulp and paper companies of the area. Here's the council's 9-point program:

1. Increased fire protection.
2. Reforestation of cutover land.
3. Private ownership of all lands that can be profitably operated.
4. Public acquisition of lands which cannot be profitably operated.
5. Taxes that will encourage private timber husbandry.
7. Adequate financing of state forestry organizations.
8. More complete utilization of wood.
9. Control of insects and diseases.

Here, at last, is a program for all wood-using industries.

How Much Timber?

The most recent figures gathered by the U. S. Forest Service for the entire U. S., give a total stand of 519 billion cubic feet of timber supporting an annual drain for all purposes and by all causes of 13.5 billion cubic feet. It included a total stand of 1,764 billion board feet of sawtimber supporting an annual drain of 47.8 billion board feet.

On the basis of these figures, S. R. Black, vice presidtnt of Weyerhaeuser Sales Co., St. Paul, Minn., a "founding father" of the previously mentioned Foretsry Industries Council and for many years a recognized authority on wood resources, makes some interesting speculation.

Estimating the present U. S. sawtimber stand at 1,600 billion board feet, he said "if we use a very high depletion—say 50 billion board feet per year, which is enough to cover all lumber production, plywood, pulp and paper, fuelwood, ties, posts and shingles and all losses by fire, insects and disease, the supply would last some 32 years without considering any annual growth. (Before the war, the ratio of pulp mill use of sawtimber to sawmill use was about 1 to 11.) Current drawings on this reserve for but two-thirds of present use extends this period to more than 40 years.

"In 1943 there were an estimated 450 billion feet of sawtimber available for cutting in the western coast fir regions of Oregon and Washington," said Mr. Black, continuing to restrict his speculation to just the old growth timber. "In the previous decade it was estimated that the yearly depletion averaged 8.3 billion feet. That rate would indicate a 54-year supply. But that is not the full story.

"The average annual growth in 1933 was 2.3 billion board feet; in 1936 it was 2.7 billion and as the old-growth forests are removed, that growth will increase. A conservative growth estimate, based on only 70% of all cutover lands becoming 55% re-stocked with seedlings, would give an annual growth of 5.7 billion board feet by 1942 (in terms common to the pulp and paper industry, this would be equivalent to about 11,400,000 cords). By the time all the old timber had been harvested, the figure would increase to 7.4 billion feet (equivalent to about 14,800,000 cords). And these figures on growth do not include anything less than a 16-foot log with an 8-inch top."

This is what Mr. Black sees as a minimum for the Pacific Northwest states under forest practice conditions existing in 1933. Certainly, after the war these practices will be greatly improved. Already, much improvtment has taken place under the handicaps of wartime operation.

Under intensive forest practice, predicts Mr. Black, the forest products production of the Northwest could reach 12.5 billion feet per year.

The Montana-Idaho-Washington-Oregon pine region contains even more standing timber than the fir region. He foresees a postwar cut in the pine region of under 5 billion feet per year, compared with a pre-war growth rate of 3.4 billion feet. But, as in other areas, as old timber is cut this growth rate will increase.

The following table shows Forest Service figures in 1938 of total U. S. commercial forest area and also of the old-growth sawtimber acreage:

U. S. FOREST AREAS

(In Thousands of Acres)

	Total Commercial Area	Pct.	Total Old Growth
Northwest	59,376	13	8,002
Central	29,231	6	367
Lake States	52,395	11	3,586
South:			
Coast Plain	62,534	14	9,430
Piedmont	49,372	11	4,958
Mountain	38,408	8	2,538
Delta	12,324	3	3,346
West	39,893	8	4,856
Total	202,531	44	25,128
Pacific Northwest:			
Coast	25,790	6	10,987
Interior	48,052	10	26,219
Total	73,842	16	37,206
California	13,655	3	8,653
So. RockyMt.	30,653	7	17,889
Total	461,697	100	100,832

The Forest Service estimates in 1938 of total stands of softwoods

Domestic and Foreign Pulpwood Consumed in the United States by Decades, 1860-1939

Decade	Total 1,000 cords	Domestic 1,000 cords	Imported 1,000 cords	Per Cent of Total Imported
1860-69	15	15	-----	-----
1870-79	215	215	-----	-----
1880-89	3,120	3,120	-----	-----
1890-99	12,845	11,000	1,845	14
1900-09	30,758	24,601	6,157	20
1910-19	47,981	39,248	8,733	18
1920-29	62,277	50,780	11,497	18
1930-39	79,678	70,598	9,080	11
Total	236,889	199,577	37,312	16

Source: U. S. Forest Service.

and hardwoods in U. S., including sawtimber, cordwood, and tops and limbs of large species follow:

TOTAL U. S. STAND
(In Million Cu. Ft.)

	Soft-wood	Hard-wood
Northeast	12,915	34,986
Central	419	11,582
Lake States	8,970	16,839
South:		
Coast	23,457	15,799
Piedmont	20,108	18,454
Mountain	3,240	16,751
Delta	918	10,779
West	14,446	14,062
Total	62,169	75,845
Pac. Northwest:		
Coast	122,446	2,642
Interior	71,710	281
Total	194,156	2,923
California	62,582	.....
So. Rocky Mts.	35,653	24
Total	376,876	142,199

Now we come to a consideration of the Forest Service data in a pre-war year on total U. S. forest growth and drain (sawtimber and cordwood combined). The question is, will these ratios apply after the war?

U. S. GROWTH AND DRAIN (1936)
(In Million Cu. Ft.)

	Growth	Drain	Ratio drain to growth
Northeast	1,260	1,370	1.1
Central	568	907	1.6
Lake States	979	983	1.0
South:			
Coast	1,626	1,691	1.0
Piedmont	2,143	1,812	0.8
Mountain	893	1,487	1.7
Delta	478	573	1.2
West	1,355	1,126	0.8
Total	6,495	6,689	1.0
Pac. Northwest:			
Coast	917	1,833	2.0
Interior	717	1,016	1.4
Total	1,634	2,849	1.7
California	155	501	3.2
So. Mts.	196	164	0.8
All regions	11,287	13,463	1.2

In further consideration of the 1936 growth and drain data as they affect this industry, certain facts must be taken into consideration. Drain and growth are not entirely comparable. Much of the growth occurs in sizes immediately usable only where size and grade is relatively unimportant, as in pulpwood. A considerable percentage of growth is in species not extensively used at the present time—yet it must be borne in mind that during the war years the number of species usable commercially has increased.

U. S. PULPWOOD CONSUMPTION
(In Cords)

From Bureau of Census:

	Imports	Total
1929	1,350,722	7,645,011
1930	1,582,201	7,195,524
1931	1,021,667	6,722,766
1932	648,188	5,633,123
1933	723,208	6,581,674
1934	971,190	6,796,659
1935	1,037,332	7,628,274
1936	1,209,760	8,715,916
1937	1,522,868	10,393,800
1938	1,293,930	9,193,991
1939	1,130,874	10,816,466
1940	1,435,820	13,742,958

War Production Board figures:

	Receipts	Total
1941	2,281,000	16,580,000
1942	1,232,000	17,275,000
1943	1,718,000	15,644,500
1944	1,650,000	16,757,500
1945 (1st Qu.)	.....	4,252,680

Two great facts cannot be overlooked in any discussion of pulpwood resources. With the exception of plywood, rigid species and quality requirements are on the decline; the use of weed species and low quality standard species is on the increase. Two, the latest available figures indicate that there is, already usable, a sufficient over-all supply of wood resources which, with growth, will meet expected national requirements for what the commentators call "a considerable time to come."

In the first place, it must be stressed that the Forest Service considers the drain for 1936 as subnormal. But growth rate, too, is probably sub-postwar.

First, let us consider the drain figures. Lumber cut was figured at 27.7 billion board feet in that year. From 1931 to 1935 lumber cut averaged 16.4 billion feet per year, or 11 billion feet per year less than in 1936. For those five years, the total was 55 billion feet less. On the other hand, during the entire war period—1940-1944, inclusive — the average annual lumber cut was 34.5 billion feet, or an excess of the 1936 figure of 6.8 billion feet per year. This totaled for the five years 34 billion feet more than in 1936. Compare this with the amount less than the 1936 figure for the 1931-35 period and you have evidence that over a period of 11 years — right up to the present day and including the heavy wartime drain — the lumber drain was actually 20 billion feet less than the 1936 Forest Service figure if that were taken as "average."

Let us consider pulpwood consumption. The following table shows it was only about one-half the current rate in 1936 — the year of the Forest Service reckoning. However, it must be remembered that pulpmill consumption of wood, while climbing, is still a minor consideration in the overall picture. For example, average lumber consumption of 34.5 billion feet in war years is equivalent to nearly 70 million cords —more than four times as much wood as is being chewed up in pulp mills.

Here are pulpmill consumption figures:

It is also important to consider how much more important to the pulp and paper industry, relatively, would be the elimination of most fire and insect and disease loss. This is revealed in the following breakdown of the 1936 drain figures:

U. S. FOREST DRAIN (1936)

	Total drain in thousand cu. ft.	Merchantable cordwood sizes only, in cords
Lumber	5,467,585	218,422
Fuelwood	3,619,482	25,551,196
Pulpwood	705,924	2,519,165
Hewed ties	354,189	92,300
Fence posts	327,060	2,113,031
Veneer logs	252,443	7,747
Mine timbers	161,016	1,147,749
Cooperage	149,447	7,010
Shingles	108,658	12,157
Other	354,203	543,258
Total	11,400,007	32,212,035
Fire	861,608	6,678,064
Insects, disease, etc.	1,201,141	4,801,810
Total	2,062,749	11,479,874
Aggregate	13,462,756	43,691,909

What To Do About It

It would appear that the same kind of spirit and organizational drive that got out the pulpwood during the war emergency should be summoned to serve the good cause of protecting and building up the nation's forest resources in the peace era.

Certainly, something can be done to reduce timber fires which are said to burn 68 acres every minute in the U. S. forest lands. More than 20,000 fires a year are caused

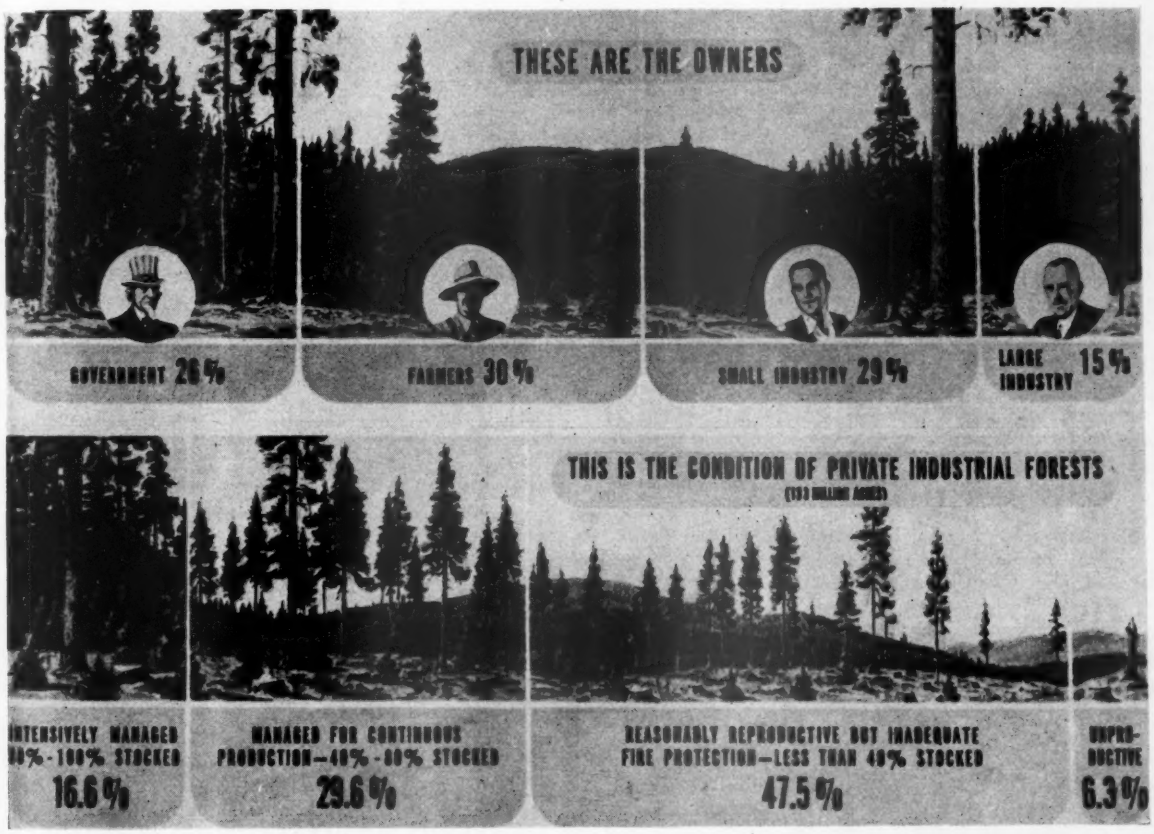
by careless smokers — alone.

Wood will grow if given half a chance in the regions where it is naturally the crop of the land. More than 10 million acres of land are now officially certified tree farms, according to the National Lumber Manufacturers' Assn. The "Trees for Tomorrow Inc." organization in Wisconsin, sponsored by pulp mills; the program to give a course of study on forestry in Virginia primary schools in rural areas, the lessons being taught farmers throughout the South — are all helping.

Total wood growth in the nation is calculated as increasing at over 3% annually. Enough wood grows in the United States every 12 seconds to build a new home—according to one redoubtable statistician.

The kind of spirit that was behind the Timber Production War Project of the Forest Service, which produced more than five billion board feet of wood products in 20 months of 1944-45 that might not otherwise have been produced — the spirit that was behind the war activities committee of the Pulpwood Consuming Industries — the spirit that motivated the industry men who gave their time to pulpwood production in the WPB — that's the kind of spirit that will win the battle for perpetual forest industries after the war.

But, perhaps the most important need will be a continued recognition by the government and public of the importance of timber and of the problems faced by industry. Certainly there should be no taxation of land in excess of the long-term value of the timber on it. The objective should be more and more timber to increase the employment in forest industries far above estimated the present 3,500,000 man-years figure of the Forest Service and to raise the material, cultural and spiritual standards of the world


THESE ARE THE OWNERS
GOVERNMENT 26%
FARMERS 30%
SMALL INDUSTRY 29%
LARGE INDUSTRY 15%
THIS IS THE CONDITION OF PRIVATE INDUSTRIAL FORESTS
INTENSIVELY MANAGED 80%-100% STOCKED 16.6%
MANAGED FOR CONTINUOUS PRODUCTION—40%-80% STOCKED 29.6%
REASONABLY REPRODUCTIVE BUT INADEQUATE FIRE PROTECTION—LESS THAN 40% STOCKED 47.5%
UNPRODUCTIVE 6.3%

IT IS ON the commercial forest lands that the timber crops for tomorrow must be grown. Increasing areas of permanent reserves—recreational areas and park forests have been removed from commercial and economic use in the U. S.

According to American Forest Products Industries, the ownership of a grand total of 461,000,000 acres of commercial forests in the U. S. is divided as shown in the above diagram.

Farmers are the largest owners. That is why pulp and paper companies are more and more turning to farmers' wood—even now in the Pacific Northwest, where this practice was unheard of a few years ago. The South has progressed rapidly in development of this market.

Small industry—ownerships of 5,000 acres or less—own about as much as the farmers. Government commercial areas—federal, state and municipal—are next in area.

It is interesting to note that large industry, including almost all of the pulp and paper companies which have forest lands of their own are owners of only about 15% of commercial forests. Of course, that includes the lumber companies, too.

The diagram, therefore, shows clearly that if pulp mills intend to materially increase their wood resources, they must develop the resources of farmers and small owners.

The lower diagram shows present condition of 153,000,000 acres of privately owned industrial forests. About 6.3% of this area is considered unproductive. The rest is restocking to some degree. More than 46% is under definite management for future production and is stocked 40 to 100%.

The significant fact is that the condition of our forest land is improving. Less than three decades ago, there was almost no organized effort to grow new trees in North America.

According to American Forest Products Industries figures, the above diagrams show the part of a tree utilized in manufacturing processes 45 years ago and the goal which is being rapidly attained today, with expansion of pulp and paper production and discoveries of by-products.

This also means more wood is being used without proportionate increase in cutting trees.

PULPWOOD ANNUAL RECEIPTS AT U. S. MILLS

	Cords
Domestic:	
1944	14,819,000
1943	13,096,000
1942	14,480,000
1941	13,744,000
Imports:	
1944	1,650,000
1943	1,718,000
1942	1,232,000
1941	2,281,000
Overall:	
1944	16,469,000
1943	14,816,000
1942	16,712,000
1941	16,025,000

U. S. PULPWOOD CONSUMPTION BY REGIONS

(In Thousands of Cords—and Percentage of Total)

	New England		Middle Atlantic		Lake States		Pacific Coast		All Other States*	
	Th. cds.	Pct.	Th. cds.	Pct.	Th. cds.	Pct.	Th. cds.	Pct.	Th. cds.	Pct.
1921	1,345	29.5	1,107	24.3	1,218	26.7	342	7.5	542	12.0
1922	1,647	29.7	1,277	23.0	1,512	27.3	346	6.2	764	13.8
1923	1,720	29.3	1,403	23.9	1,545	26.3	396	6.8	806	13.7
1924	1,601	27.8	1,312	22.7	1,561	27.1	436	7.6	856	14.8
1925	1,713	28.1	1,328	21.8	1,609	26.4	450	7.4	992	16.3
1926	1,832	27.1	1,416	20.9	1,844	27.3	538	8.0	1,133	16.7
1927	1,712	25.4	1,270	18.8	1,832	27.1	712	10.6	1,221	18.1
1928	1,732	24.2	1,207	16.9	1,840	25.7	959	13.4	1,420	19.8
1929	1,758	23.0	1,223	16.0	1,813	23.7	1,296	17.0	1,552	20.3
1930	1,513	21.1	1,116	15.5	1,679	23.3	1,351	18.8	1,535	21.3
1931	1,170	17.4	875	13.0	1,405	20.9	1,345	20.0	1,925	28.7
1932	969	17.2	675	12.0	1,224	21.7	953	16.9	1,810	32.2
1933	1,171	17.8	702	10.7	1,352	20.5	1,336	20.3	2,018	30.7
1934	1,110	16.3	694	10.2	1,305	19.2	1,525	22.5	2,160	31.8
1935	1,096	14.4	788	10.3	1,454	19.1	1,693	22.2	2,596	34.0
1936	1,191	13.7	878	10.1	1,665	19.1	1,933	22.2	3,047	34.9
1937	1,283	12.4	993	9.6	1,724	16.6	2,681	25.7	3,710	35.7
1938	1,336	14.5	810	8.8	1,496	16.3	1,792	19.5	3,758	40.9
1939	1,660	15.3	891	8.2	1,658	15.4	2,335	21.6	4,270	39.5
1940	2,080	15.1	1,064	7.7	1,866	13.6	3,069	22.4	5,661	41.2
	Northeast		Appalachian		Lake States		Pacific Coast		South	
1941	3,476	21.5	1,396	8.6	2,346	14.5	3,014	18.6	5,941	36.8
1942	3,484	20.7	1,478	8.8	2,416	14.3	2,967	17.6	6,502	38.6
1943	3,211	21.2	1,417	9.3	2,271	15.0	2,266	14.9	6,006	39.6
1944	3,158	18.8	1,489	9.0	2,473	14.7	2,481	14.8	7,153	42.7

*Chiefly Southern.

Source: 1921-1940, Bureau of the Census; 1941-1944, Forest Products Bureau, War Production Board.

Prospects for Pulpwood Production In Southern United States

Thirty years ago the timber supply of the South was dwindling so rapidly that it was generally conceded in informed circles that the forest industries of that section of the U. S. would disappear in comparatively few years.

Today the trend has been reversed and this has happened because of the policies of the pulp and paper industries.

The U. S. Forest Service, however, contends that the South still is growing less than one-half the timber crop that it should grow. Lack of adequate fire control, wasteful practices of small, portable mills and many farmers and absentee owners are blamed by both the progressive industries and the government officials. With adequate stocking and fire protection, it is held the yields of timber can be doubled in the South. Eighty per cent of U. S. forest fires are in the South and have caused 13% of the timber drain in that region.

An important point, made Apr. 20 at the Forest Industries Council meeting in New Orleans, attended by many pulp and paper mill executives, is the need for further revising the federal revenue code in order to encourage the husbandry of timber.

The Forest Service reveals that half the forest area of the South is still not within marketing distance of the pulp and paper mills and, therefore, much expansion is still possible. Yet, 50 of these mills in the South—20 of them built between 1935-1942 — are using some 6,000,000 cords annually and producing close to half of the pulp production of the entire nation.

Prior to outbreak of the war, federal estimates of sawtimber growth per year for this region were placed at 18.6 billion board feet. Competent foresters believe intensive fire protection will increase the growth 50 to 100%.

In many parts of the South the chief need is believed to be for more wood use.

The overall situation is sound, as shown by an increased growth of 18.8 million cu. ft. annually required to balance a 20.7-year drain period. Current growth per acre was recorded as 37.4 cu. ft. and an average annual growth of 39.6 cu. ft. was needed.

Total volume was calculated by the Forest Service as 138 million cu. ft., total drain, 6,689 million cu. ft., and total growth, 6,495 cu. ft.

Forest Service Data

A U. S. Forest Survey of the "Lower South" states of Georgia, Florida, Alabama, Mississippi, Louisiana, and parts of Texas, Arkansas and Oklahoma discloses that:

1. 122 million acres or almost 60% of total land area is in productive forest growth.
2. Forest area is expanding. It now occupies 13 times as much land as does the principal farm crop—cotton.
3. Timber stands of 1,122 million cords of sound trees are composed 47.5% of pine and 52.5% of hardwood and cypress. Sawtimber component of this stand is 56% pine and 44% hard-

wood and cypress.

4. Only 6% of forest is old-growth, while 86% is second growth and partially cut stands and 8% is denuded. 60% of total acreage is held by industrial and non-farm owners, 33% is on farms and 7% is in national and state forests.

The South's position as a leading source of forest products is based on four species of pine—longleaf, loblolly, slash and shortleaf—and some 28 species of hardwoods. A table and map with this article give information on pulpwood species.

Net forest increment (growth less death and decay), according to the Forest Survey, averaged only 100 bd. ft. (⅓ of a cord) per acre per year on saw-timber stands and 0.36 cord per acre per year on the cordwood area. With the forest growing stock built up adequately, and with reasonable fire control, the U. S. Forest Service emphasizes that these yields could easily be doubled.

Average net increment of pulpwood for Lower South states (which takes into account mortality drain), as calculated by the Forest Service just before the war, was Alabama .41 cords per acre; Arkansas, .33; Florida, .11; Georgia, .41; Louisiana, .43; Mississippi, .49; Oklahoma .12, and Texas, .60.

Fire Is No. 1 Problem

Fire is the No. 1 Southern forest problem. Over 80% of the forest fires occurring in the United States are reported from the South. Fires cause up to 13% of the drain on the Southern forests and cause an estimated $30,000,000 of damage annually. The vast majority of Southern woods fires are man-caused. The reasons for the high degree of incendiarism are deeprooted in Southern tradition. The problem can be solved only by patient re-education of the rural people. Less than half of private forest area is under organized fire protection.

Commodity drain (growing stock material cut from the forest whether fully utilized or not) on the forests of the lower South in 1937, an active pre-war year was as follows:

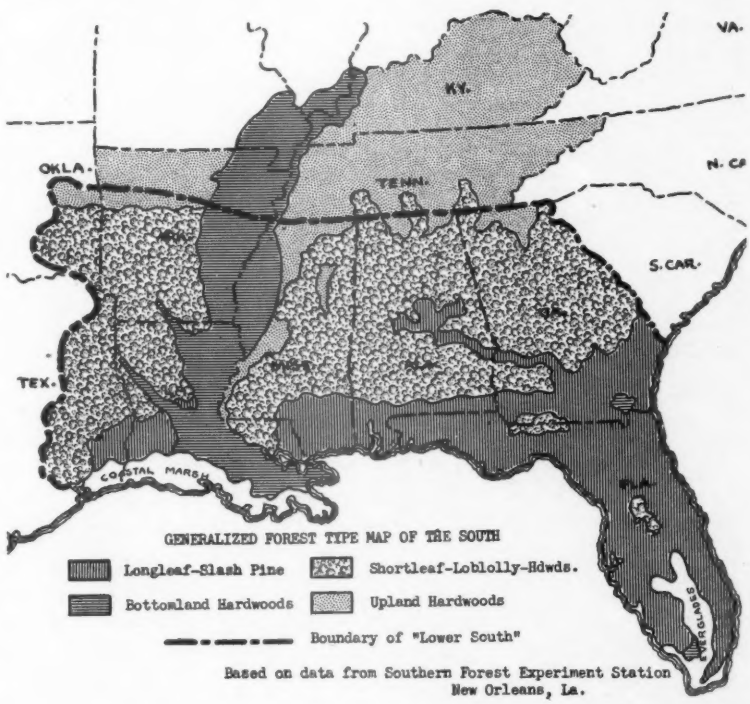
Lumber	53%
Fuelwood	20%
Crossties	7%
Pulpwood	5%
Veneer	3%
All other	15%

COMPARISONS OF U. S. PULPWOOD CONSUMPTION BY SPECIES

(In Thousands of Cords)

	1937	1939	1941	1944
Southern Pine	2,659	3,834	6,402	6,841
Spruce	2,836	2,133	[1]3,671	[1]3,689
Balsam Fir	391	357		
Hemlock	2,264	2,218	[2]3,563	2,246
Poplar	531	477	[3]966	———
Jack Pine	300,786	359,755	[3]501,000	———
Balsam Fir—Domestic	320,715	283,506	[4] ———	———
Imported	71,447	74,705	[4] ———	———
Beech, Birch and Maple	257,410	241,039	344,000	———
White Fir	135,384	159,428	———	———
Other	412,692	373,975	658,000	———
Slabs and Mill Waste	565,391	319,014	[5] ———	———
Aspen	———	———	———	661,710
Yellow Poplar	———	———	———	284,882
Chestnut	———	———	———	434,982
Birch	———	———	———	8,377
Gum	———	———	———	160,166
Mill Waste and Cordwood	———	———	———	287,335
Miscellaneous[6]	———	———	———	988,873
Total Pine	———	———	———	7,994

[1]Excludes western spruce. [2]Includes western spruce and white fir. [3]Includes tamarack, other eastern softwoods. [4]Includes aspen, cottonwood. [5]Not available. [6]Includes jack pine, cottonwood, ak, maple, willow.



The U. S. Forest Survey, made before the advent of defense and war demands for timber, showed that growth and drain on the forests were just about in balance. In some localities there was serious over-cutting and the saw-timber and higher quality tree sizes were being cut faster than they could be replaced. For the eight-state area the relation of increment to drain on cordwood areas was 113%, while on saw-timber it was only 89%. Here are figures on the pulpwood:

Pulpwood (Only) Increment and Drain In Lower South

(In Cords)

	Net Increment	Commodity Drain	Relation of Increment to Drain
Ala.	7,779	7,484	104
Ark.	6,902	6,636	104
Fla.	2,300	3,558	65
Ga.	8,752	5,402	162
La.	6,960	6,260	111
Miss.	7,813	7,312	107
Okla.	485	764	63
Tex.	6,357	4,541	140
Total	47,348	41,957	113

Source: U. S. Forest Survey.

PULPWOOD GROWTH on a central Mississippi farm is illustrated in these three photographs. The man and the fence gate (to right of him) are in about same position in each picture.

Top view—Two year old slash pine seedlings shown a year after being planted on "worn out," eroding hillside.

Middle—Five years later. Pines are 15-20 ft. high; pruned and protected from fire.

Lower view—Another five years have passed. Trees are 30-35 ft. high; 6-9 inches diameter. Hillside is saved and useful; the farmer has permanent investment.

Wood Is Smaller

PULP & PAPER INDUSTRY, as a result of recent inquiries at some of the larger mills in the South, found general agreement that their pulpwood is now averaging four to 10 inches in diameter, two to three inches less than before the war. Union Bag & Paper Corp., in a survey of its own wood, found the average diameter was 7 inches two years ago. Now it is probably an inch less.

Thirty years ago, loblolly pine was yielding 25-30 cords per acre on first cutting but today one-half to 15 cords are cut. One mill, requiring 2,000 cords daily, consumes wood from an area one mile square each day, taking off only about 6 cords to the acre. Six healthy pine trees to an acre are actually considered the minimum requirement for re-seeding. Several mills in the South use from 1,500 to 2,000 cords daily.

A 30,000 word study of the Southern resources, entitled "Southern Forestry" was published recently in mimeograph form for limited circulation by the Research and Development Bureau of the Illinois Central System. Vice President A. E. Barr of the I. C. System, whose freight is 10% forest products in the South, provided this magazine with a copy. For those who have not had the opportunity to see this work—one of the most exhaustive treatises on Southern forestry—we publish a summary herewith.

Prospects for the South

"The only immediate brake on its (the Southern industry's) growth," said the I. C. book, "is the relative scarcity of raw material, a condition that can be corrected in large measure by bringing the stocking of the forests up to par and by adapting pulping processes to hardwoods at present regarded as non-pulping species."

It says "much the same observations can be made for the building board industry in the South. . . .

"The pulp and paper producers are among the largest industrial owners of forest land in the South. Seeking to insure themselves against ever having to move again, insofar as raw material supply is concerned, they have purhcased and now own over 5 million acres of well blocked-out second-growth timberland and are still buying. They have put these lands under the management of technical forestry staffs in order to produce a continuous succession of timber-crops as the nucleus of their

future supply of raw material. To satisfy the remainder of their needs, the mills are drawing upon a large area of tributary non-company timberlands owned by farmers and other individuals. Purchases are made either direct or through wood-buying contractors. Because pulp mills can use small timber, they create a market for the smaller trees."

A recent trend which PULP & PAPER INDUSTRY found in the South was a conviction among southern operators that they will have to build up inventories after the war. In the past six or seven days' inventory was considered adequate. The weather hazards, labor problems and recent crisis in supply have made mill management more inclined to be more forehanded.

"Southern Forestry" observed that an important element in Southern lumber production are the small portable sawmills. They cut 60% of all the lumber produced in the area. Because their operators are often unskilled and irresponsible, such mills almost invariably clear-cut the land leaving no provision for future growth, manufacture a poor quality product, pay sub-standard wages and stumpage prices—many foresters regard them as second only to fire as a destroyer of the Southern forests.

Future of Industry

The future of forest products offers much promise, says the I. C. System's summary:

Construction—Wood has become an engineering material since the development of the TECO Ring Connector and of laminated wood. With either technique huge structures can be fabricated at low cost.

Pulp and paper—There are already over 9,000 uses for paper and more are constantly being developed.

Chemicals and plastics — Most promising of all future markets, says the Illinois Central report. Cellulose which makes up two-thirds of the wood cell is the source of paper, rayon, cellophane and many chemicals. An average acre of Southern land will produce from 5 to 11 times as much cellulose in the form of yellow pine as it will in the form of cotton.

The Illinois Central review made these comments on methods of harvesting timber in the South:

Clear cutting — Removal of all trees from the area. Sale advantage is largest immediate cash return. To restock seedlings must be hand-planted.

Seed Tree cutting—Much more constructive policy than clear cutting. Leaving seed trees on logged-over land provides for natural reforestation, but no further income is likely for from 10 to 20 years.

Selective cutting — Under most conditions this is the best method, the report says. An annual or periodic crop of selected trees is harvested, leaving the forest "capital" of younger fast growing trees intact. The investment is never exhausted—the forest is a permanent source of wealth. A necessary corollary is thinning and improvement cutting by which crowded stands are thinned to secure maximum growth rate and low-grade trees are removed to make for more valuable species or individuals.

Under multiple-use forestry the woodland is made to serve many purposes. Thinnings, tops, and limbs from logging, and low-grade trees produce revenue as pulpwood. Longleaf and slash-pine—the "dual-crop" trees provide additional income if worked for naval stores before harvesting.

Grazing and forestry, regarded by some authorities as incompatible, are being profitably combined in some parts of the South.

Because Southern forest trees are prolific seed producers, artificial reforestation is practically never necessary if seed trees are left in logging, fires are controlled and grazing temporarily excluded. Bad logging practices and repeated fires have devastated some 8%, or about 10 million acres, of forest land in the lower South which must have seedlings planted on it if it is ever to grow trees. There is also a large acreage of sub-marginal farm land that should be artificially restored. State and industrial nurseries supply one-year-old seedlings at an average of $2.00 per 1,000. Planting cost per acre on small operations is about $5.00 including all material and labor.

History of Forestry

The history of forestry in the South begins in 1892—interestingly enough with a railroad man—George W. Vanderbilt, scion of the famous New York Central family. On his Biltmore Estate near Asheville, N. C., selective cutting practices and sustained yield management were established and a tree nursery installed. The estate's forests are still functioning today, under guidance of the U. S. Forest Service.

Industrial pioneers in Southern forestry were Henry E. Hardtner of Urania Lumber Co., Urania, La., and Col. Wm. H. Sullivan of Great Southern Lumber Co., Bogalusa, La. As early as 1904 the Urania Co. began to experiment with securing new crops of pine from seed. The practice of selective cutting and reservation of seed trees has been so successful that it has never been necessary to use artificial reforestation on any part of the company's 110,000 acres of forests. The Great Southern Co., which converted to seed tree cutting in 1918, established a forest nursery in 1922 and on its non-restocking cut-over lands launched the largest single hand-planting project in history. In 1938, after having hand-planted over 45,000 acres and placing approximately 237,000 acres under management, Great Southern sold out to the Gaylord Container Corp. who are continuing the forestry practices of the predecessor company.

Creation of the Southern Forest

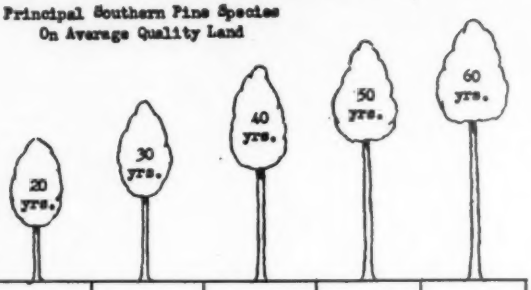
Forest Fire Protection on Private and State Lands
In the Lower South
Average 1938 - 1941

State	Commercial Forest Area			Forest Area Burned			Fire Protection Expenditures (000 dollars)
	Needing Protection (Millions of Acres)	Protected (Millions of Acres)	Proportion Protected (Percent)	Protected (Millions of Acres)	Unprotected (Millions of Acres)	Total (Millions of Acres)	
Ala.	18.2	8.7	48	0.3	1.1	1.4	197.2
Ark.	19.9	10.9	55	0.1	1.1	1.2	192.3
Fla.	20.7	4.5	22	0.1	7.4	7.5	412.8
Ga.	20.5	4.5	22	0.1	3.9	4.0	217.9
La.	15.7	6.7	43	0.1	0.7	0.8	227.9
Miss.	14.7	4.8	33	0.1	4.9	5.0	143.1
Okla.	12.7	1.5	12	0.1	3.5	3.6	40.3
Tex.	15.8	8.8	56	0.2	0.5	0.7	150.7
Total	138.2	50.4	36.5	1.1	23.1	24.2	1582.2
Percent	100.0	36.5		2.2	26.3	17.5	

Source: E. L. Demmon, "South's Forest Frontier and War", Social Forces May 1943

COMPARISON OF SIZE AND TIMBER PRODUCTION PER ACRE

Principal Southern Pine Species
On Average Quality Land



LONGLEAF PINE					
Height of tree (ft.)	36	52	62	70	77
DBH (inches)*	5.1	6.8	8.2	9.3	10.2
Cordwood per acre (cords)	14	28	39	48	55
Saw-timber per acre (ft-BM)	1,000	5,000	11,000	17,500	23,500
LOBLOLLY PINE					
Height of tree (ft.)	44	61	74	84	91
DBH (inches)*	6.5	8.8	10.8	12.8	14.5
Cordwood per acre (cords)	27	46	61	71	78
Saw-timber per acre (ft-BM)	5,000	17,000	28,500	37,500	43,000
SLASH PINE					
Height of tree (ft.)	48	63	73	80	85
DBH (inches)*	6.0	8.3	10.1	11.4	12.2
Cordwood per acre (cords)	35	48	58	65	69
Saw-timber per acre (ft-BM)	4,000	13,000	22,000	28,000	32,000
SHORTLEAF PINE					
Height of tree (ft.)	34	49	61	70	77
DBH (inches)*	4.5	6.6	8.4	9.8	11.0
Cordwood per acre (cords)	18	41	56	66	73
Saw-timber per acre (ft-BM)	250	6,900	17,800	27,200	33,500

Source:— U. S. Dept of Agriculture Farmers Bulletins 1256, 1486, 1517, 1671 Technical Bulletin 492.
*Diameter at breast height

Experiment Station of U. S. Forest Service in 1921 and establishment of state forestry departments stimulated development of Southern forestry.

In 1925 a study showed 82 properties totalling 4,780,00 acres in 11 Southern states were subject to forestry practices; a similar inquiry in 1940 showed that 684 properties totalling 21,609,000 acres were practicing forestry in some form in that yar. Several have developed highly effective programs directed by professional foresters.

More than 45 national and regional trade professional, and civic organizations are active in varying degrees in promoting conservation and utilization of Southern forest resources. The Southern Forest Experiment Station conducts investigations on its eight widely separated experimental forests in many aspects of forestry and related fields.

Forest Taxations

Forest taxation and forest credit are important elements in woodland management. Passage on Feb. 24, 1944, of the New Federal Revenue Law removed a serious tax burden from many operators, the railroad survey holds. The increasing use by the states of severance tax laws which relieve forests of ad valorem taxation is another progressive step. Timber growing is at best a long-term business; there is a great need in the South for some means of financing sound forest operations on a business basis, but as yet practically no progress has been made in this direction.

South's Opportunity

A great opportunity exists for forestry in the South in taking up the slack caused by the shrinkage and dislocation of southern agriculture says the Illinois Central report. There is less crop land now than 80 years ago, whereas rural population has been doubled. In the past 15 years cotton, the most important cash crop, has been forced from more than 20,000,000 acres, with resultant loss of over 160,000,000 man-days of employment in that period.

The principal problems of forestry in the South, which must be solved if its is to meet the challenge of the future, may be briefly summarized:

1. Forest management — The encouraging progress thus far made is only a beginning. A survey by the National Lumber Manufacturers Assn. indicates that less than 25% of the privately owned timberlands of the South are under management—and most of this area is in large industry owned blocks. Forest management among the vast number of small owners has scarcely started. The number of technically trained foresters who are in actual contact with timberland owners to advise them on specific problems is very small—far from adequate.

2. Integrated utilization — To reduce waste and to maximize returns trees should be routed from the stump to the uses for which they are most valuable—whether pulpwood, saw timber, poles or piling.

3. Cooperative marketing—By enabling small owners to pool their cuts, with resultant increased bargaining power and knowledge of the market, the co-ops show promise of bringing better prices for farm timber. The movement is in its infancy.

4. Wood-using industries — Good forestry is not possible without good markets. There is room now for more forest industries. The Southern Forest Experiment Station estimates that more than half of the forest area is still not within marketing distance of pulp mills. Industries employing a higher degree of processing than heretofore are needed to absorb more local labor. But in a region having abundant and cheap fuel, excellent transportation facilities, plentiful labor, and low-cost raw materials there is every reason to be omptimistic about future development.

Statistics on Pacific Northwest Pulpwood Resources Are Brought Up to Date--Drain and Growth Reckoned

The only area in the United States in which the U. S. Forest Service has available recent official surveys, bringing up-to-date the information on the nation's pulpwood resources, is in the Pacific Northwest. (Elsewhere in this issue we have made estimates for other areas with the assistance of various authoritative organizations.)

Periodic surveys on Washington, Oregon, Northern Idaho and Western Montana have been special features of PULP & PAPER INDUSTRY's Review Number each year. We are pleased to be able to present this information again in this issue —brought up-to-date by the regional Forest & Range Experimental Stations officials.

It is especially interesting today because of plans for new mills and expansion of operations in western Washington, Idaho and Montana. Also, Lake State operators are now buying wood from Montana and Idaho.

Accompanying tables show the volume in thousands of cubic feet of pulp woods—available for cutting and other than Douglas fir—in western Washington and western Oregon have been just recently made, revised as of January 1, 1945.

These figures are from data prepared by the Pacific Northwest Forest and Range Experiment Station U. S. Forest Service, Portland, Ore., based on forest surveys started in 1930, and completed in 1933 and 1934. The results were first published in the Review Number of this journal in 1937, and revised in each Review Number since then. References may be made to the 1938 issue for greater detail as to the forest study.

Timber on municipal watersheds state parks, national parks, and primitive areas in national forests which because of laws or declared public policy is not available for commercial use, was not included.

Since completing the survey the experiment station staff has brought the inventory of the forests of the majority of the counties in the region up to date through field examination.

To date the reinventory has been completed for the following 27 counties: Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, King, Kitsap, Lewis, Mason, Pacific, Pierce Skagit, Snohomish, Thurston, Wahkiakum, and Whatcom Counties Washington, and Benton, Clatsop Columbia, Coos, Lane, Lincoln Linn, Polk, Tillamook, Washington. and Yamhill Counties, Oregon. The reinventory in Clackamas and Marion Counties, Oregon, will be completed this year.

Volumes have been made current as of Jan. 1, 1945, by adjusting the reinventories of the abovenamed counties and the original inventories for the other counties for depletion through cutting and increment through growth.

The cubic foot volume estimates give the total sound wood content of the stem of the tree, exclusive of bark and limb wood. Decayed material is omitted, as well as the entire volume of all cull logs having more than two-thirds of the board foot content defective. No deduction was made for breakage in logging.

The ratio of timber in the various ownership classes remains about the same as in previous years.

Approximately 45% is privately owned; 43% on national forest lands, and 12% on other public lands, such as county, state, Indian reservations, etc.

The total volume of pulpwoods in western Oregon is slightly greater this year than the figure given in the 1944 Review Number due to the shifting of some 365 million cubic feet from a reserved-from-cutting to an available-for-cutting status.

Not all of the timber shown in the tables will be available for pulp; considerable volumes of both western hemlock and Sitka spruce are utilized annually for lumber. In 1943, more than 600 million board

Volume In Thousand Cubic Feet[1] of Pulpwood Other Than Douglas Fir In Western Washington and Western Oregon, Available for Cutting,[2] by Species Groups[3]

Adjusted to January 1, 1944

Species—	Western Oregon	Western Washington	Total
Western hemlock	5,413,000	15,525,000	20,938,000
Sitka spruce	748,000	1,153,000	1,901,000
Balsam firs[4]	3,425,000	6,011,000	9,436,000
Mt. hemlock, Engelmann spruce	804,000	313,000	1,117,000
Black cottonwood	72,000	128,000	200,000
Total	10,462,000	23,130,000	33,592,000

Adjusted to January 1, 1945

Species—	Western Oregon	Western Washington	Total
Western hemlock	5,405,000	15,172,000	20,577,000
Sitka spruce	773,000	1,107,000	1,880,000
Balsam firs[4]	3,501,000	6,099,000	9,600,000
Mountain hemlock & Engelmann spruce	804,000	313,000	1,117,000
Black cottonwood	72,000	128,000	200,000
Total	10,555,000	22,819,000	33,374,000

[1]Includes all trees 4 inches and more, diameter breast high.
[2]Excludes timber reserved from cutting in municipal, state and federal ownership.
[3]Compiled by Pacilc Northwest Forest and Range Experiment Station from Forest Survey data adjusted for cutting depletion and growth.
[4]Includes Pacific silver fir, grand fir, noble fir, Shasta red fir, white fir, and alpine fir.

1936 — For All Ownerships

Species—	Western Oregon	Western Washington	Total
Western Hemlock	6,439,886	18,654,070	25,093,956
Sitka Spruce	1,145,377	1,625,924	2,771,301
Engelmann Spruce	46,643	9,259	55,902
White Fir	1,652,378	314,023	1,966,401
Amabilis Fir	763,712	6,567,606	7,331,318
Noble Fir	1,338,837	614,175	1,953,012
Alpine Fir	24,675	37,234	61,909
Mountain Hemlock	931,527	372,386	1,303,913
Total	12,343,035	28,194,677	40,537,712

Note—1944-5 tables exclude government-owned reserves.

feet of western hemlock logs and 300 million board feet of Sitka spruce logs, cut in the Douglas-fir region, were manufactured into lumber. However, it has been estimated that a total of nearly one-half million cords of slabs, edgings, and trimmings from sawmills is used for pulp annually. Since Douglas-fir, of which there is about 65 billion board feet in the region, is the dominant lumber species, it was not included in the volume of pulpwoods. However, this species comprises up to 50 per cent of the raw material utilized by the Kraft pulp and insulating board mills. By far, the greater quantity of Douglas-fir used by these mills is sawmill waste. One plant will be built shortly in which it is proposed to use 100 per cent Douglas-fir waste. Hydraulic log barkers installed in the larger sawmills will make a much larger percentage of the sawmill waste available for pulping. Also hydraulic slab barkers have been developed and are now in operation in two pulp mills.

Volume of Pulpwoods, Other Than Douglas Fir, in Western Washington and Western Oregon Available for Cutting, by County (In thousands of cubic feet)

WASHINGTON

County—	1936	1944	1945
Clallam	3,732,187	2,741,000	2,672,000
Clark	34,248	33,000	32,000
Cowlitz	972,384	881,000	870,000
Grays Harbor	2,902,400	2,567,000	2,481,000
Island	8,934	9,000	9,000
Jefferson	3,456,382	2,237,000	2,215,000
King	2,166,924	2,051,000	2,131,000
Kitsap	23,295	19,000	19,000
Lewis	2,423,835	2,067,000	2,028,000
Mason	465,119	334,000	331,000
Pacific	1,908,220	1,832,000	1,753,000
Pierce	1,358,908	1,187,000	1,148,000
San Juan	11,461	11,000	11,000
Skagit	1,836,559	1,699,000	1,664,000
Skamania	1,825,243	1,831,000	1,845,000
Snohomish	2,266,424	2,176,000	2,159,000
Thurston	53,818	31,000	31,000
Wahkiakum	508,615	438,000	463,000
Whatcom	1,006,741	986,000	957,000
Total	26,961,697	23,130,000	22,819,000

OREGON

County—	1936	1944	1945
Benton	58,273	34,000	33,000
Clackamas	1,141,042	1,087,000	1,241,000
Clatsop	1,089,450	1,163,000	1,131,000
Columbia	48,139	36,000	37,000
Coos	434,653	310,000	389,000
Curry	185,953	187,000	192,000
Douglas	1,635,494	1,548,000	1,570,000
Hood River	424,900	292,000	340,000
Jackson	961,702	958,000	954,000
Josephine	110,289	107,000	107,000
Lane	2,812,664	1,330,000	1,286,000
Lincoln	666,705	471,000	438,000
Linn	1,465,262	1,417,000	1,251,000
Marion	528,369	505,000	505,000
Multnomah	227,155	30,000	132,000
Polk	220,277	163,000	156,000
Tillamook	984,874	761,000	732,000
Washington	84,693	42,000	41,000
Yamhill	22,774	21,000	20,000
Total	11,859,653	10,462,000	10,555,000

Source: Pacific Northwest Forest & Range Experiment Station. Includes all trees 4 inch and more in diameter, breast high.

The 1945 figures were adjusted for cutting depletion and growth to Jan. 1, 1945 and the 1944 figures were similarly revised to Jan. 1, 1944. Also reckoned in the calculations are shifts of timber areas from reserved-for-cutting to available-for-cutting status. This accounts for the increase in Oregon in 1945 over 1944. The 1936 figures were published in the Review Number of this publication in 1936 and further explanation of those figures will be found in that issues.

The table on Inland Empire pulpwood — for eastern Washington northern Idaho and western Montana—was supplied by the Rocky Mountain Forest & Range Experiment Station, in Missoula, Mont. Actually revised in 1943, it is rated still up-to-date for 1945 on basis of growth and drain.

It is pertinent to note that one company, the Inland Empire Paper Co., Spokane, Wash., takes about 50,000 to 60,000 cords annually from Northern Idaho. As for pulpwood from Idaho and Montana taken by Lake States operators, all of the activities have been confined to those adjacent to the Great Northern Railroad between Eureka and the Continental Divide. Thus far, only lodgepole pine in 100-inch bolts, taken down to a 3-inch diameter with bark on, has been shipped. The producers load about 25 cords per gondola car and are paid $9.00 per cord.

In the St. Maries area, a small volume of peeled Engelmann spruce logs have been shipped to the Nekoosa-Edwards Pulp & Paper Co., Port Edwards, Wis.

An interesting aspect of growth in the Oregon area is illustrated by a report dealing with the Depoe Bay, Ore., region. Here, 30 years ago, a slow ground fire destroyed the residual hemlock-spruce stand, and seemed to have arrested reproduction indefinitely. But it now shows a re-stock stand of between 30 and 40 cords of pulpwood per acre. This is significant news, perhaps, in considering burn areas on the Western forestry map.

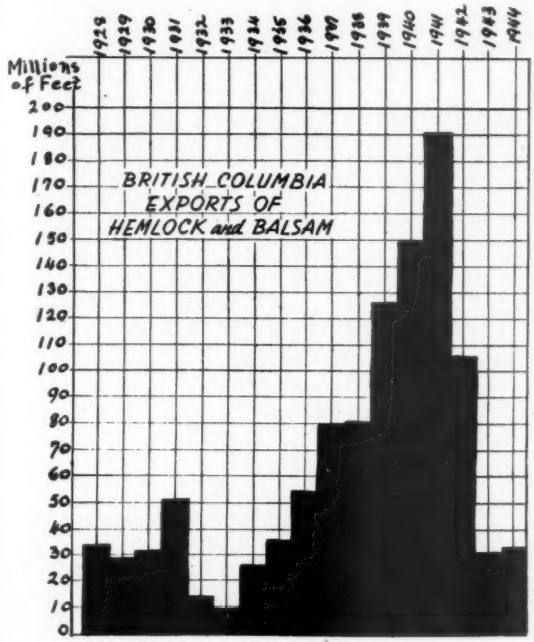
Using Farm Wood In West

The use of farmers' cordwood is a trend in the Far West which is increasingly interesting operators. The installation of hydraulic barking machines is making this an economic source of wood. Slab hydraulic barkers are now in operation in three Puget Sound mills and they are expected to serve in supplementing supplies from the big whole

EXPORTS OF PULPWOOD SPECIES FROM BRITISH COLUMBIA TO U. S.

(All Washington State Mills)
In F.B.M. — About 500 F.B.M. to One Cord

Year—	Total	Hemlock	Balsam
1941	191,532,734	153,284,101	38,248,633
1942	106,793,550	88,758,672	18,034,878
1943	29,723,223	25,018,342	4,243,412
1944	32,027,805	26,554,456	5,473,349



HOW CANADIAN PULPWOOD EXPORTS to American mills on the Pacific Coast have fallen off since a limited Canadian embargo was imposed in 1942 is shown here.
Some American mills on Puget Sound argue they were located in that area on the assumption that they could get part of their raw material from B. C. But manpower shortages and demand for hemlock for lumber cut heavily in Canadian production of pulpwood. The Canadian Timber Control permitted export of only 30 million bd. ft. in 1943 and 32,500,000 bd. ft. in 1944. (About 60,000 cords in 1943 and 65,000 cords in 1944).

log hydraulic barkers in other mills.

Everett Pulp & Paper Co., a soda pulp and book paper mill, has been a user of farmers' wood for many years because it utilizes cottonwood or poplar. But now, other western mills which in the past used mostly the typical large diameter trees of the west, are finding use for smaller sizes—once disdained in that region as of no manufacturing value.

Second growth fir is being purchased in 8-foot lengths with the bark on down to a diameter of 10 inches, by both St. Helens Pulp and Paper Co., St. Helens, Ore., and Longview Fibre Co., Longview, Wash. Precisely what form these operations are to take in the future at these two mills is unknown at this time because in either instance the purchases have just started.

Crown-Zellerbach Corp. is also taking advantage of this situation where the native species are fitted to operations at their various mills. At the Crown-Zellerbach mill at Lebanon, Ore., 8-foot lengths of pulp species are being bought by the cord at ceiling prices, and even the Camas, Wash., pulpwood species in 4 or 8-foot lnegths by the cord are being taken.

The farmers of the Pacific Coast are being supplied with information by pulp and paper companies along the lines that have featured similar campaigns in the South. The farmer is learning economic values of trees of different species and ages.

Pre-war figures listed total timber volume of western Washington and Oregon at 125,088 million cu. ft., total drain at 1,833 million cu. ft., and total growth at 917 million cu. ft. Growth per acre was 42.6 cu. ft., with an annual increase of .63 per acre required to bring about an annual growth of 85.4 cu. ft. per acre at the end of a 69-year drain period.

In the Inland Empire, total prevolume was listed as 197,079 million cu. ft., total drain as 2,849 million cu. ft., and total growth, 1,634 million. The region seems sound from the standpoint of total wood bulk requirements. Within the bounds of possibility is an average growth rate of about 44 cubic feet per acre—and this does not have to be achieved for some 65 years.

INLAND EMPIRE PULPWOOD* By Species and Locality in Thousands of Feet

Subregion2/	Engelmann spruce			Hemlock			Balsam fir			Black cottonwood			All species		
	Saw-timber trees	Cordwood trees	Total	Saw-timber trees	Cordwood trees	Total	Saw-timber trees	Cordwood trees	Total	Saw-timber trees	Cordwood trees	Total	Saw-timber trees	Cordwood trees	Total
	Thousand Cubic Feet														
Northeastern Washington	15,600	14,200	29,800	24,000	22,300	46,300	27,500	42,300	69,800	110	50	160	67,210	78,850	146,060
North Idaho	474,000	129,000	603,000	198,000	183,000	381,000	1,250,000	472,000	1,722,000	9,000	1,000	10,000	1,931,000	785,000	2,716,000
Western Montana	676,000	151,000	827,000	27,000	27,000	54,000	111,000	124,000	235,000	36,000	6,000	42,000	850,000	308,000	1,158,000
Total for Inland Empire	1,165,600	294,200	1,459,800	249,000	232,300	481,300	1,388,500	638,300	2,026,800	45,110	7,050	52,160	2,848,210	1,171,850	4,020,060

*Based on data from Rocky Mountain Forest & Range Experiment Station, U. S. Forest Service, Missoula, Mont., for non-reserved commercial forests as of Jan. 1, 1943. It is estimated drain of pulp species has been offset by growth during the past year and therefore the volume in 1945 is as shown above. Data includes sound wood volume from stump to a 4- to 6-inch diameter of all trees larger than 5 inches d.b.h. The cottonwood estimate includes also the volume of peeled limbs 4 inches and larger diameter. Saw timber includes coniferous trees larger than 13 inches d.b.h. and cottonwood trees larger than 11 inches d.b.h.; cordwood includes the volume of trees from 5 inches d.b.h. to saw-timber size.

Northeastern Washington consists of Ferry, Spokane, Stevens and Pend Oreille Counties. Northern Idaho is the portion north of the Salmon River; western Montana is the portion west of the Continental Divide.

GROWTH RECORDS OF 15 SAMPLE PLOTS OF WESTERN HEMLOCK AND SPRUCE PULPWOOD IN OREGON—VOLUME, PERIODIC ANNUAL GROWTH AND MEAN ANNUAL GROWTH

Case histories of growth in typical western forests are shown below. Thornton T. Munger and G. B. Fedde, Pacific Northwest Forest & Range Experiment Station, U. S. Forest Service, compiled this data.

One spruce plot has made to date 303 cu. ft. mean annual growth per year. Mean annual growth is the volume of an even-aged forest of a given age divided by its age. These plots, in northwestern Oregon, have been under observation from six to 16 years.

Values are on a horizontal-acre basis. Dates of initial and last measurement are given by month and year. Cubic foot volumes include total volumes of all trees over 2.6 inches in diameter. International bd. ft. volumes include volumes of trees over 6.6 inches diameter. Scribner bd. ft. volumes include trees over 11.6 inches in diameter.

Only living trees were measured; so, total growth is only of those trees which survived at end of period. One plot experienced heavy mortality and actually showed negative growth.

Plot name and number		Site	Age of plot (Yrs.)	Date measured	Interval (Yrs.)	Cubic feet			International board feet			Scribner board feet			Percent[1] spruce	Percent[1] hemlock
						Volume	Annual periodic growth	Mean annual growth	Volume	Annual periodic growth	Mean annual growth	Volume	Annual periodic growth	Mean annual growth		
Cascade Head	1	III+	83	6-35		22,062			158,164			121,265				
			89	8-40	6	23,820	293	268	173,297	2,522	1,947	133,332	2,011	1,498	2	97
	3	II	83	6-35		22,866			169,634			135,979				
			89	8-40	6	24,223	286	272	179,540	1,651	2,017	145,784	1,634	1,638	45	35
	4	II-	83	6-35		21,259			151,783			120,868				
			89	8-40	6	22,988	280	258	166,381	2,433	1,869	134,009	2,190	1,506	84	15
	5	II	83	6-35		24,139			179,345			147,457				
			89	8-40	6	26,998	142	303	198,160	3,184	2,230	164,105	2,824	1,847	89	10
	6	III+	83	6-35		20,444			149,442			117,450				
			89	8-40	6	21,707	210	244	157,687	1,374	1,772	126,215	1,461	1,418	23	76
	7	III+	83	6-35		21,985			156,852			120,134				
			89	8-40	6	23,666	280	266	170,971	2,353	1,921	132,764	2,105	1,492	29	68
	8	III-	83	6-35		21,240			148,429			107,101				
			89	8-40	6	22,449	201	252	156,998	1,427	1,764	116,080	1,496	1,504	3	97
	9	III-	83	6-35		21,934			155,969			126,801				
			89	8-40	6	22,744	135	256	162,578	1,102	1,827	132,970	1,028	1,494	100	0
	10	III-	83	6-35		17,863			125,429			101,312				
			89	8-40	6	18,369	184	206	134,620	1,532	1,513	110,149	1,140	1,238	67	32
	12	III+	83	6-35		19,399			139,762			108,094				
			89	8-40	6	20,490	182	230	152,107	2,058	1,709	119,249	1,859	1,340	25	75
	13	II-	83	6-35		19,103			137,342			104,428				
			89	8-40	6	20,417	219	229	146,337	1,499	1,644	112,256	1,305	1,261	16	84
Clatsop	1	II-	77	4-28		15,055			112,650			91,360				
			93	4-44	16	17,738	168	191	135,827	1,449	1,460	116,036	1,542	1,248	6	94
	2	III-	94	4-28		14,173			103,320			79,650				
			110	4-44	16	10,352	-239	94	77,735	-1,599[2]	707	60,953	-1,162[2]	554		100
	3	II-	36	7-33		6,992			29,900			9,080				
			47	4-44	11	9,910	265	211	96,032	2,376	1,198	27,194	1,647	579	19	81
	4	III+	36	7-33		5,498			17,580			1,760				
			47	4-44	11	8,273	252	176	42,002	2,220	894	13,570	1,074	289	19	81

[1] Percentage by board-foot volume, except for Clatsop plots which are computed by number of trees of merchantable size.
[2] Negative periodic growth due to heavy mortality from various causes.

Balance Foreseen in Northeast U. S.

A leading forestry engineer for one of the biggest pulp and paper companies in this region, commented on pulpwood resources as follows in a letter to PULP & PAPER INDUSTRY:

"Counteracting the recent trend to cut smaller trees because of the critical pulpwood demand, it appears rather certain that cuts in the near future will be less intensive because of increased mechanization and growing tendency of land owners to require higher minimum diameter limits—in the pulpwood species. This trend will not be in sufficient volume to give significant figures against the general background of lack of detailed data on growth and drain.

"As for gross drain on softwood pulpwood species, the expected sustained demand plus the existing pulpmill capacity plus developing truck transportation indicate a larger cut than at present.

"There has been a recent sharp increase in the use of hardwood for shipbuilding and airplane stock which has now disappeared. This temporary drain will be gradually approached again because of the increased use of hardwood for pulp.

"Hardwood growth has been far above the drain until the recent attack by the Bronzed Birch Borer.

"This appears to me to be the picture for the next 10 to 15 years.

"Beyond that, large areas of second-growth following budworm kill and four-foot pulpwood operating will come into high productive condition. With no indicated increase in pulpmill capacity in the softwood species, there are good grounds to expect a balance between growth and drain."

Northeast forests have been cut continuously since 1632. The peak was reached in 1840. Sawmills declined to about 400 mills in 1930, mostly portables. About seven million acres of forest lands have been acquired by the industry in the Northeast, much of which has supplied a second cut. Present stand on land held by the industry averages over-all about four cords per acre. Current sawtimber growth is already in excess of drain. However, much of the current growth is not of a character in demand by industry. Use of hardwoods by pulp mills has been making headway. Pulp mill capacity is about 3,800,000 cords in New England, New York, Pennsylvania and New Jersey. Complete integration of the industry would indicate a pulpwood requirement of 5,500,000 cords annually, but the unlikelihood of complete integration, as well as the shift to higher grade papers, probably pegs the normal demand at nearer 3,500,000 cords if prices of imported pulp and pulpwood remain at reasonable levels.

Total volume of timber before the war was 47,901 million cu. ft. Total drain was 1,370 million cu. ft., and total growth, 1,260 million cu. ft., according to the Forest Service. Annual growth per acre was 24.6 cu. ft. and an average annual growth of 28.9 cu. ft. was needed at the end of a 35-year drain period

Products Shift in Middle West States

As far as sawtimber is concerned, The Lake States seems to have run its course. There is a shift to production of bulk wood. Current pulp mill capacity of Wisconsin, Michigan and Minnesota is 2,183,000 cords annually and represents an investment of $90,000,000. The temporary lumber industry is being replaced by permanent bulk wood using industries — pulp, paper and chemical. This, it is believed, will put the region on a much sounder long-term basis than in the past.

About 25 per cent of the regional pulp mill requirements are from outside, Canada accounting for a large part. Some observers believe this a temporary condition. One company, using 6,000 carloads of peeled pulpwood annually, has started a producing forest.

Insofar as forest use is concerned, experts state, the Lake States have turned the corner.

The pertinent pre-war Lake States data follows:

Total volume, 25,809 million cu. ft., total drain, 983 million cu. ft. and total growth, 979 million cu. ft. The growth per acre was 31 cu. ft. The average annual growth required at the end of a 26-year drain period—36.7 cu. ft.

The paper mill capacity of Iowa, Missouri, Illinois, Indiana and Ohio is considerable and it is supplied chiefly from outside sources. The total stand suitable for pulping is reported as about 2,000,000 cords.

Of the 27,541,000 acres of commercial forests in those states 74% is in farm-woodlands. All problems are distinctly local in character—not even state-wide. Education is being offered in satisfactory woodlands management through various extension services.

Total volume according to Forest Service is 12,001 million cu. ft.; total drain, 907 million cu. ft., and total growth, 568 million cu. ft. Current annual growth was 20 cu. ft. per acre and an average growth of 43.8 cu. ft. was needed at the end of a 13.3 year drain period.

California-South Rocky Mts. Outlook

More than 100,000,000 cords of species commonly used in pulp and paper manufacture are available in California. The pulp mill capacity of the state is small. Drain exceeded growth tremendously both in cubic and board feet, according to the Forest Service, although the increase in annual growth required is low. Both growth and drain are secured upon very heavy stands of mature and over-mature timber and the drain period is therefore very long.

S. R. Black, vice president, Weyerhaeuser Sales Co., who has had considerable experience in the California timber business, and is an authority on that state's productivity, says:

"There are some 45 billion board feet of standing sawtimber in California's redwood region alone, whereas the annual average cut in that region for 20 years or more has not exceeded one-half billion feet. The redwood region is an area of rapid growth and with improvement in forest practices, the annual growth should equal the average annual cut of timber even beore the old growth is harvested."

The total pre-war volume of California timber was listed as 62,582 million cu. ft., total drain, 501 million cu. ft., and total growth, 155 million cu. ft. The annual growth was listed as 13.2 cu. ft. per acre, with an average annual growth of 42.7 cu. ft. per acre needed at the end of a 125-year drain period, or an annual increase of only 0.23 cu. ft.

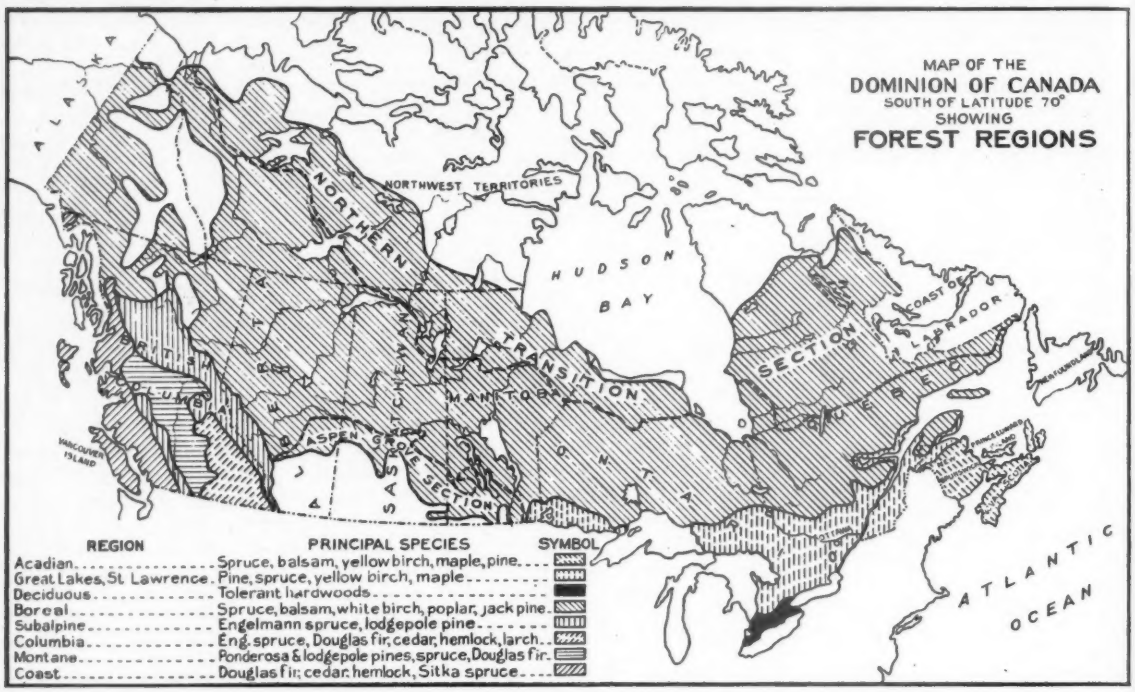
In the South Rocky Mt. states, there is a negligible pulp mill capacity in this region, and drain-growth ratios are in close balance. They are 0.8 for total timber and 1.1 for sawtimber. The total stand is 37,677 million cubic feet including 124,992 million board feet on a total producing area of 28,703,000 acres, is definitely capable of supporting a much heavier drain, for old-growth timber occupies 62 per cent of the producing area.

The growth rate is low and a permanent drain equal to that which might be justified during a period of growing stock regulation could not be maintained.

LAND PAST USEFULNESS FOR LUMBER, NOW PRODUCES PULPWOOD—And provides even greater employment. Here is young longleaf pine (about 23 years old) which reproduced naturally on lands near Bogalusa, Louisiana, for Gaylord Container Corp., successor to Great Southern Lumber Co.

In the Far West, too, a new era opens for vast timberlands. In 1944's two biggest deals, Rayonier Incorporated acquired Bloedel, Donovan Lumber Mills' holdings on the Olympic Peninsula and Crown Zellerbach Corp. bought extensive Oregon tracts from Clark & Wilson Lumber Co., which will liquidate all business by the end of 1947.

PULPWOOD RESOURCES OF CANADA In East--For 85 Years or Forever?



ALTHOUGH Canada's pulp and paper operations have experienced vast expansion during the past two or three decades, with more than 100 mills in production and with gross output valued in excess of $330,000,000, no country offers greater scope for the industry's future expansion.

This assumption is based partly on Canada's geographical position and her economic status and her wealth of waterpower, but basically the factor that gives Canada her greatest advantage in pulp and paper manufacture is the enormous extent of her pulpwood resources.

Only two other countries in the world possess greater forested areas —Soviet Russia and Brazil.

In eastern Canada the drain on these resources has been well within the extent of natural regeneration of the forest and on the west coast where a long-term program for sustained yield is now being evolved there appears to be more timber suitable for pulpwood than for almost any other purpose.

Total land area of Canada is about 3,500,000 square miles. Of this, about 1,200,000 square miles are forested. Not all this forest is productive, but the productive area measures 770,565 square miles —roughly equal to the combined area of the United Kingdom, France, Spain, Portugal, the Netherlands, Denmark and Sweden. This represents 22.2%, or more than one-fifth of the total land area of Canada, but in the nine provinces of Canada 38% of the land area consists of productive forests. The forests of the Yukon and the Northwest Territories are at present only of local value.

Of the 770,565 square miles of productive forest, 430,000 square miles are accessible. In the productive forest area more than half is young growth; the remainder is already of merchantable size.

Of the forest areas now regarded as economically inaccessible it is probable that in future a considerable proportion will prove of commercial value, depending on the provision of transportation facilities and rising values. In the nine provinces of Canada the productive forested areas alone are nearly four times the area at present devoted to farming.

Climate, topography and soil conditions determine the location of the forests in Canada. Eighty per cent of the total accessible stand is in Quebec, Ontario and the maritime provinces, with British Columbia accounting for 9 per cent and the prairie provinces for 11 per cent. Of accessible saw timber, however, British Columbia possesses 44 per cent, the eastern provinces 50 per cent and the prairies 6 per cent This latter fact is one that marks one of the major differences between the pulp and paper industry in eastern Canada and in British Columbia. In the east the market for pulpwood is the dominant consideration; in the west, pulp and paper mills are in competition with sawmills for their share of logs.

Jack Pine Now Used

Of the 130 distinct species of trees found in Canada, only 33 are conifers or softwoods such as the pulp and paper industry principally uses, but they comprise more than 75% of the standing timber and 80% of the wood used for all purposes.

Spruce and balsam are the predominant pulpwood species in eastern Canada just as hemlock and balsam are outstanding in British

Sawmills Get Pulp Species in West

CANADIAN PRODUCTIVE FORESTED AREA

	Square Miles	%
Softwood or coniferous	467,775	60.7
Mixed softwoods and hardwoods	210,390	27.3
Hardwood or broad-leaved	92,400	12.0
Total	770,565	100.0

Source: Dominion Forest Service.

AVERAGE ANNUAL CUT OF TIMBER AND ITS USES

Based on the 10-year period, 1930-1939

	Million Cu. Ft.	%
For fuel	863.8	34.3
For sawmill products	797.6	31.7
For pulp and paper	706.3	28.0
For hewn ties, poles, logs, etc.	151.3	6.0
Total	2,519.0	100.0

Source: Dominion Forest Service.

DISTRIBUTION OF ACCESSIBLE STANDING TIMBER IN CANADA

All Species

	Million Cu. Ft.	%
Maritime Provinces	15,790	7.5
Quebec	81,931	38.7
Ontario	71,032	33.6
Prairie Provinces	24,577	11.6
British Columbia	18,326	8.6
	211,656	100.0

Source: Dominion Forest Service.

CANADIAN PULPWOOD SPECIES — CURRENT ESTIMATED VOLUMES

(Provided for this issue of PULP & PAPER INDUSTRY by the Dominion Forest Service)

Material of Sawlog Sizes*

In Millions of Board Feet†

	Spruce	Balsam	Jack and Lodgepole Pine	Hemlock	Poplar	Total
Prince Edward Island	75	25			5	105
Nova Scotia	2,714	789		684	5	4,192
New Brunswick	3,102	1,202	248	210		4,762
Quebec	32,286	17,701	1,847	72	2,540	54,446
Ontario	27,901		11,914	793	3,292	43,900
Manitoba	778	5	71		1,610	2,464
Saskatchewan	2,960	30	620		2,420	6,030
Alberta	9,000	400	3,000		4,500	16,900
British Columbia	50,222	31,484	9,782	56,662		148,150
Total	129,038	51,636	27,482	58,421	14,372	280,949

Smaller Material‡

In Thousands of Cords

Prince Edward Island	600	80		5	10	695
Nova Scotia	6,702	15,639	26	256	840	23,463
New Brunswick	30,383	16,286	2,217	66	3,943	52,895
Quebec	313,397	287,747	40,048	1,048	22,079	864,319
Ontario	209,217	29,223	61,713	500	125,073	425,726
Manitoba	6,877	385	3,253		18,800	29,315
Saskatchewan	8,290	355	2,830		53,800	65,275
Alberta	50,000	1,550	90,000		90,000	231,550
British Columbia	84,995	69,936	313,201	20,460		488,592
Total	910,461	421,201	513,288	22,335	314,545	2,181,830

Total Pulpwood Species

Equivalent Volumes in Millions of Cubic Feet of Standing Timber (Includes Sawlogs and Smaller Material)

Prince Edward Island	86,625	14,835		585	2,045	104,090
Nova Scotia	1,378,500	2,002,554	3,042	179,748	80,895	3,644,739
New Brunswick	4,234,149	2,168,700	313,701	53,712	374,585	7,144,847
Quebec	67,138,083	37,542,918	5,090,109	138,384	2,653,765	112,563,259
Ontario	30,588,708	3,419,091	9,829,587	232,167	12,602,883	56,672,436
Manitoba	974,991	46,140	396,150		2,138,590	3,555,871
Saskatchewan	1,618,170	48,105	466,890		5,640,980	7,774,145
Alberta	7,821,000	268,950	11,187,000		9,535,500	28,812,450
British Columbia	20,943,033	15,077,508	38,786,775	14,802,798		89,610,114
Total	134,783,259	60,588,801	66,073,254	15,407,394	33,029,243	309,881,951

*Probably only a minor portion of this wood will be used for pulp.
†Approx. 500 bd. ft. equals one cord. Very little of this, however is cordwood or pulpwood. The total figure in this table, 280,949 million bd. ft. equals about 562 million cords.
‡Mostly pulpwood.

Columbia, but there are indications that other species will be increasingly used as new utilization processes are developed and as stands of the more popular species are reduced in certain areas.

In the east, white pine, jack pine and poplar are still regarded as inferior pulpwood, but the trend towards kraft production, especially in Ontario, has presented an opportunity for much greater use of jack pine as well as other species hitherto neglected.

In British Columbia almost every major softwood species has been used to some extent in pulp manufacture, but hemock still represents about 60 per cent of the total pulpwood used—a situation somewhat complicated in recent years by the growing demand for hemlock by sawmills. In the east wood is earmarked for the pulp mills as soon as it is cut in the forest, but on the west coast the destination of hemlock—to pulp mill or lumber mill—is sometimes undetermined until it reaches the saws. The better grade hemlock often goes to lumber.

Of the total forest area in Canada over 90 per cent is owned by the government. Rights to cut timber under lease have been granted on 14.3 per cent of the total area and 77.3 per cent has not been alienated in any way.

Estimated Timber Stands

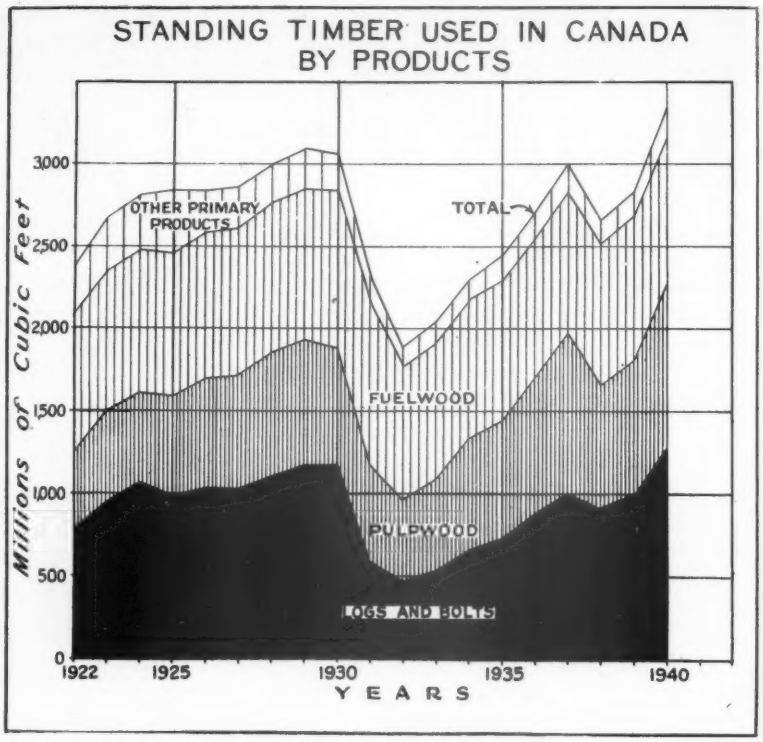
The latest estimates compiled from surveys conducted by Dominion and provincial authorities indicate that the total stand of timber in Canada is 313,140,000,000 cubic feet, of which 236,024,000,000 cubic feet is of coniferous species and 77,116,000,000 cubic feet of broad leaved species. Of the total stand it is considered that only 211,655,000,000 feet is accessible under existing means of transportation and values. This accessible timber includes 252,161,000,000 feet, board measure of saw timber, of which 215,090,000,000 board feet is softwood and 37,071,000,000 board feet is hardwood. Smaller material suitable for pulpwood, fuelwood, etc., is estimated to amount to 1,419,000,000 cords, of which 897,000,000 cords is softwood and 602,000,000 cords, hardwood.

Under normal conditions — for instance, during the 1930-39 period, 28% of the annual timber cut in Canada was for pulp and paper, averaging 706.3 million cubic feet. For fuel the percentage was 34.3 and for sawmill products, 31.7%; for hewn ties, poles, etc., 6%.

There has been considerable variation in the estimates concerning the extent of British Columbia's stands of merchantable standing timber, but the figures compiled by F. D. Mulholland of the provincial government are generally recognized. His estimate of the total stand in the coastal region is 155,129,000,000 feet of all species, in the in-

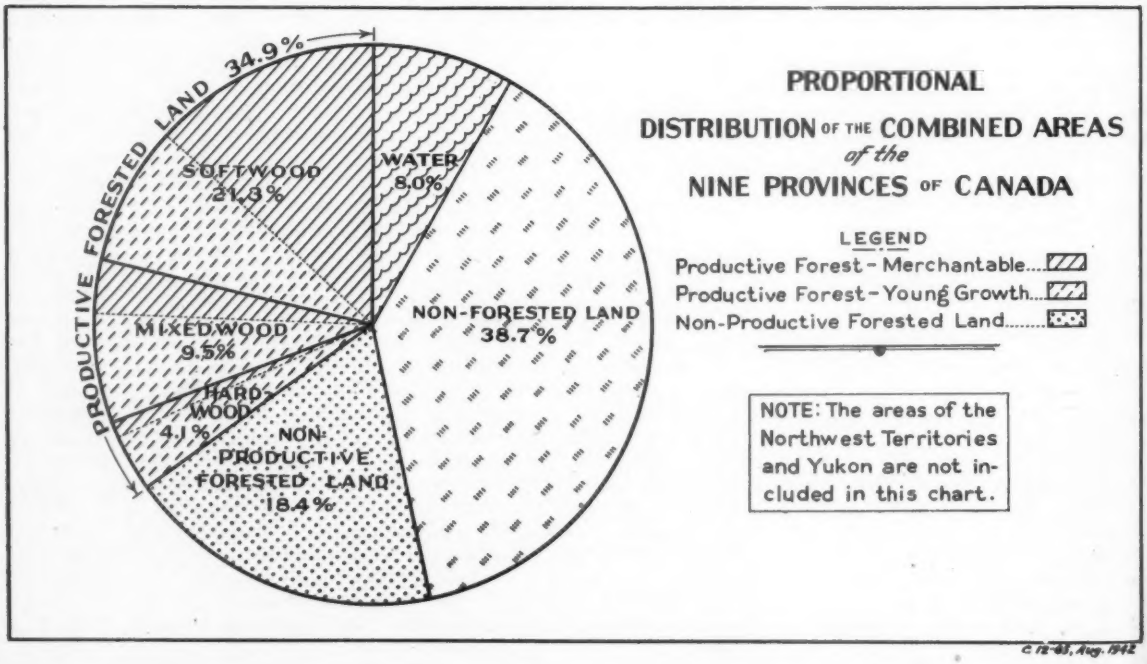
terior, 99,370,000,000 feet of all species, for a grand total of 254,499,000,000 feet, of which 109,738,000,000 feet is described as accessible. Of the principal pulpwood species he estimates a total of 213,768,000,000 cords. He estimated to be 46,135,000,000 feet (92,270,000 cords) of western hemlock in the coastal region, 10,527,000,000 feet (21,054,000 cords) in the interior, for a total of 56,622,000,000 feet (113,324,000 cords), of which a total of 24,983,000,000 feet (49,966,000 cords) is described as accessible. Of spruce there is estimated to be 9,949,000,000 feet (19,898,000 cords) on the coast and 40,273,000,000 feet (80,546,000 cords) in the interior, for a total of 50,222,000,000 feet (100,444,000 cords) of which 17,631,000,000 feet (35,262,000 cords) is accessible.

Roughly speaking, 10% of the entire cut and 12% of the cut on the coast of British Columbia is processed in pulp and paper mills. In general, the species used are not those preferred for the manufacture of other forest products, although with the diminution of available Douglas fir, hemlock, the predominant pulp species, has been increasingly used for the production of lumber in recent years. On the basis of a 10-year average, about 2,641,000,000 feet of timber are cut in British Columbia annually, of which 2,352,000,000 feet is cut in the coastal region. A total of 276,000,000 feet (552,000 cords) of this is consumed by the pulp and paper mills, or 10.5 per cent of the total cut



According to the latest information available from provincial sources, the total quantities of spruce and balsam in the accessible productive area of eastern Canada are approximately as follows: 1. Sawlogs — spruce, 54 billion feet; balsam, 15 billion feet; 2. Small material (pulpwood, etc.)—spruce 477,000,000 cords; balsam, 194,000,000 cords (a total of 671,000,000 cords) and 11.7 per cent of the coast cut.

Of the total cut of spruce and balsam in eastern Canada records for the five-year period 1934-39 show that the ratio is approximately four cords of pulpwood to the equivalent of one cord taken out as saw timber, in direct contrast with the situation prevailing on the west coast. Using a rough conversion factor of two cords to the thousand, the saw timber stand of



these species is the equivalent of 138,000 cords. Adding this to the 671,000,000 cords of small material gives a grand total in cords of 809,000,000 cords. But as these are only estimates, the figure may be rounded off to 800,000 cords. Assuming that the use ratio given above will hold in future, D. Roy Cameron, Dominion forester of the Canadian department of mines and resources at Ottawa, estimates that of this total stand, some 640,000,000 cords will be used for pulpwood purposes and the balance converted to saw timber.

Industry Holdings

The total woodland holdings of the pulp and paper industry in Canada are about 92 million acres. This includes both Crown lands and freehold area. Of the above, nearly 90 million acres is in eastern Canada. There is no direct estimate of the volume of pulpwood on the holdings of the industry. But in his book entitled "The Newsprint Industry," John A. Guthrie shows that 23 mills which together accounted for 87.5% of the total newsprint production in 1937, cut altogether 1.23% of their pulpwood resources, and the Dominion Bureau of Statistics reports that in 1937 the total cut of pulpwood from company limits was 4,230,000 cords. If the ratio of 1.23 per cent is applied to this figure the conclusion is that the pulpwood reserve amounts to about 350,000,000 cords, or nearly four cords to the acre.

Of the total acreage in pulpwood holdings, about 50% is classified as containing merchantable timber, 30% bears young growth and 20% is wasteland, water areas, etc. On this basis the actual pulpwood stands would carry around 8 cords per acre, and this is, in fact, approximately the average cut per acre off pulpwood lands.

The year 1937 may be considered as a good average for the industry and in that year the total cut of pulpwood was some 8,298,000 cords, but of this amount, as indicated above, only 4,230,000 cords was actually cut from company limits. Of this total some 65,000 cords only was cut from limits in western Canada, leaving a balance of 4,165,000 cords for eastern Canada.

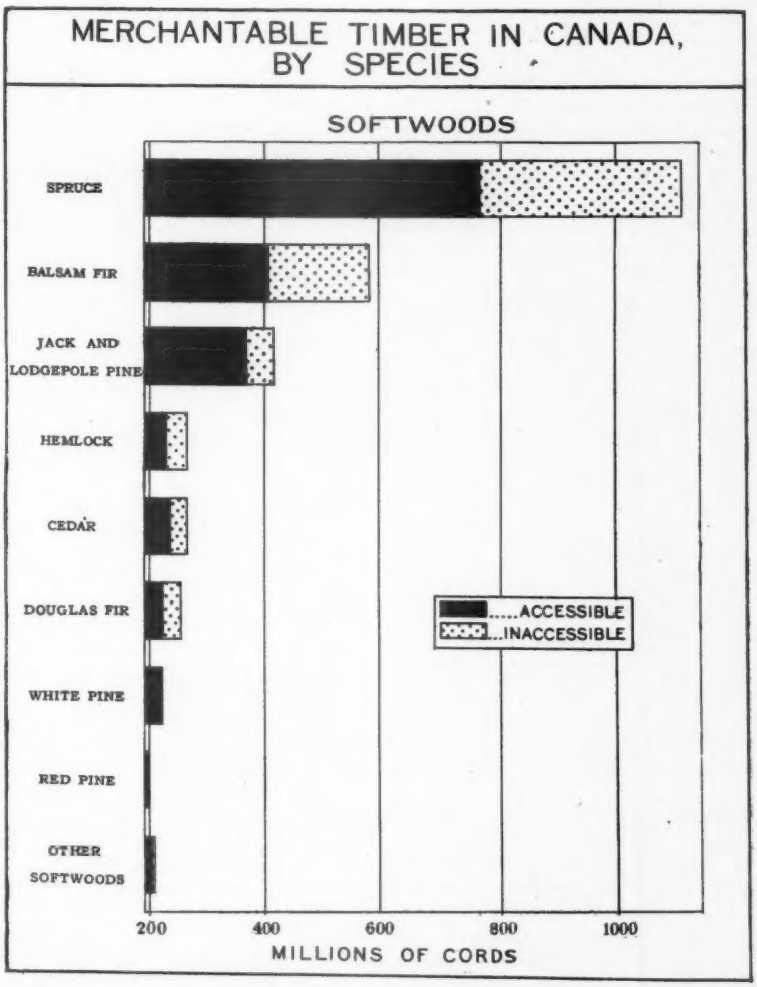
The commonly used estimate of the number of cubic feet of standing timber required to produce a cord of pulpwood is 117. This conversion factor takes into account the unused parts of the tree in stump and tops, and makes some allowance for smaller timber knocked down and destroyed in the course of operations. Using this conversion factor, we find that the pulpwood cut on company limits in eastern Canada during 1937 amounted to about 487 million cubic feet, or 5.4 cubic feet per acre when prorated against the total holdings in the same territory.

"It is interesting to compare the depletion rate with the general situation existing over the accessible productive forest area of Canada as a whole," says Chief Forester Cameron. "The total area concerned is approximately 275 million acres. The total depletion, including cut and wastage from fire, insects, disease and other causes, averaged for the 10-year period 1930-39, inclusive, is estimated at 3.6 billion cubic feet. This works out

TIMBER VOLUME AND ANNUAL DEPLETION
Based on the 10-year period, 1930-1939

			Million Cu. Ft.
Total stand of timber of merchantable size			313,140
Total stand of such lumber accessible			211,656
Average cut for domestic and industrial use:			
For fuel	863.8	23.8%	
For sawmill products	797.6	21.7%	
For PULP and PAPER	706.3	19.5%	
For hewn ties, poles, logs, etc.	151.3	4.5%	
Total			2,519.0 69.5%
Loss of timber by fire			404.0 11.2%
Loss by fungus, insects, etc.			700.0 19.3%
Total consumption by all agencies			3,623.0 100.0%

Total average annual consumption, therefore, represents 1.7 per cent of the stand of accessible timber of merchantable size.
Source: Dominion Forest Service.



at 14 cubic feet per acre, of which about 10 was used and four destroyed. Consequently, use of their own holdings by the pulp and paper companies is little more than half the average for the country as a whole."

Future Supply

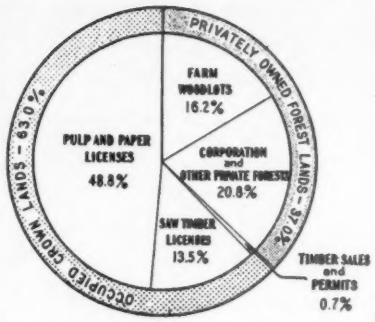
How well off is Canada in terms of available pulpwood supply for future operations?

So far as British Columbia is concerned, some authorities contend that Mr. Mulholland's estimate previously quoted is too conservative and that it does not take into sufficient account the changing technique in the woods and mill, in extension of transportation and other factors. H. R. MacMillan, for instance, estimates that in the coastal region alone there are roughly 200 billion feet of mature timber according to closest standards of utilization, including all trees down to 7-inch diameter breast high, measured to show true content in all forest products. Mr. MacMillan's judgment cannot be overlooked, for he was British Columbia's first chief forester and is today one of the outstanding figures in the timber industry. Mr. MacMillan does not differentiate between saw and pulp species, but Mr. Mulholland's figures indicate that about one-third of the total stand in the region would be hemlock and spruce.

As for eastern Canada, Mr. Cameron told the woodlands section of the Canadian Pulp and Paper Association that based on good average performance and disregarding growth and losses through fire, insects and other causes, the industry might consider its pulpwood supply sufficient for approximately 85 years.

But Mr. Cameron added: "We cannot, of course, as foresters except either the accretions through growth or the losses through fire, insects, and other causes. However, as a starting point we can say that there is every indication that the pulp and paper industry is at the present time on a sustained yield basis in so far as its woodland holdings are concerned. On the other hand, we must point out that this position results from the fact that the woodland holdings of the industry are so extensive that utilization proceeds at a very retarded rate."

So far as British Columbia is concerned, there seems every likelihood that when the Sloan Royal Commission completes its survey of the province's forest resources and recommends a government policy it will include a program for the maintenance of sustained yield on a working circle or similar basis. This has been aggressively advocated by the industry, on condition that "working circles" are operated in a practical way.


PRIVATELY OWNED FOREST LANDS — 37.0%
OCCUPIED CROWN LANDS — 63.0%
FARM WOODLOTS 16.2%
CORPORATION and OTHER PRIVATE FOREST 20.8%
TIMBER SALES and PERMITS 0.7%
SAW TIMBER LICENSES 13.5%
PULP AND PAPER LICENSES 48.8%

OWNERSHIP OF CANADA'S OCCUPIED FOREST LANDS IN 1941
Nearly half are licensed to pulp and paper industries. Over 38 per cent of Canada's area grows what is rated as merchantable timber.

As for eastern Canada, the woodlands holdings of the industry are in the main, being cut over on a systematic basis. In effect, there already is regulation of the cut on an area basis and this represents an important step in forest management. Speaking of the pulp and paper industry in eastern Canada generally, the balance between growth from timber holdings and wood requirements of industry is very much in the industry's favor although the situation varies a good deal as between one unit in the industry and another.

Summarizing the position in eastern Canada, Mr. Cameron states: "The condition actually existing is that the industry as a whole has timber holdings that are, according to careful analysis, well above present requirements. The productive capacity of neither the pulp and paper industry nor of the lumber industry had been reached prior to the war, and we are not entitled to believe from present knowledge that any demand requiring appreciable expansion of capacity will arise in the immediate postwar period.

"So long as this condition exists there is, from the standpoint of forest administration, no detriment to the public interest in the retention of present woodland holdings by the pulp and paper industry."

Throughout the industry there has been a demand for greater security in the tenure of timberland holdings in Canada. In British Columbia the pulp companies have most of their timber holdings in the form of government granted licenses and leases, and opportunities for acquiring additional timber are practically confined the same type of tenure. The industry maintains that if private forestry is to materialize in British Columbia it will be necessary to set up a system which will provide the operator with a permanent interest in his holdings if he is to follow management practices with long range forestry objectives.

Closer Utilization

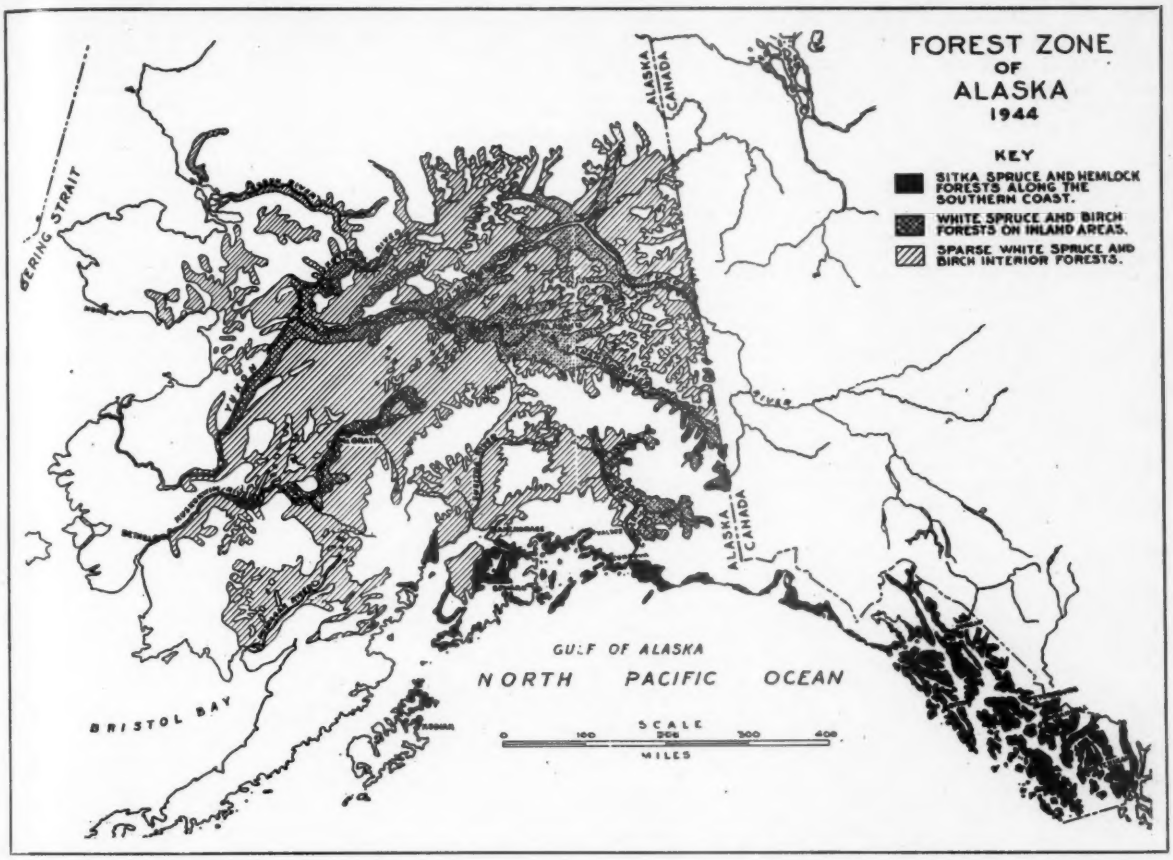
Closer utilization may be expected to become an increasingly important factor in enlarging the available supplies of pulpwood. During the past two years interesting experiments have been carried out on Vancouver Island to determine how much of the debris left in the forest by primary logging may be salvaged for pulp mill use. The experiments are by no means conclusive but they indicate that the pulp and paper industry may be able to develop in this field an important new source of raw material, even though it may be costlier. In any event pulp and paper operators emphasize this salvage material cannot begin to meet all their requirements. They must continue to depend, as in the past, on a reasonable share of normal-size logs.

Utilization is also a problem in the eastern provinces. "Generally speaking," says A. Koroleff, manager of the woodlands section, Canadian Pulp & Paper Association "closer utilization of wood from trees that are cut is definitely desirable when economically feasible; but extension of cutting to smaller trees should be considered with due caution. For silvicultural reasons, young, rapidly growing trees are usually best left for the next crop and the amount of work and the cost of logging mount very rapidly with reduction of tree size.

"In eastern Canada our heavy dependence on river drive is a particularly important factor in this issue. Loss of small wood through sinkage is high, and increases very rapidly with reduction of diameter of bolts or logs. Sinkage losses may be prohibitive in driving wood of 1½" to 2½" top diameter; they are very high even with 3" wood, especially in balsam fir on long drives. Good seasoning, such as follows summer cutting, can ameliorate this condition only to some extent.

"Closer utilization of tree tops in some cases fully warrants consideration."

ALASKA--Holds One of Greatest Pulpwood Stands



A great virgin area for the future development of a pulp and paper industry is in Southeastern Alaska. Here is one of the great coniferous forests of of the world—especially suited to pulp and paper manufacturing under the present technical and economic limitations of the industry.

But for the present, the second attempt of the U. S. government in 15 years to lease a timber stand for a privately owned pulp and paper industry awaits the end of the war.

Wood and its delivery to a mill would be comparatively cheap but the costs of establishing a plant in the Ketchikan area would be highest (per employe) for any industry ever initiated on the continent.

The uncertainties of the postwar conditions (foreign competition, government controls, etc.) and, in particular, move by the Interior Department to seize control of all available pulptimber in the territory through its wards, the Indians, are other deterrents.

When the war is over, however, and future conditions crystallize, the Crown Zellerbach Corp. and possibly other companies, again will take under consideration the government offer.

The present offer, which actually has not been withdrawn, for about 14 million cords (7½ billion feet) of hemlock and spruce in the Ketchikan region of the National Forest, to support a mill of 150 tons daily pulp capacity for ten years and 525 tons for the succeeding 40 years. These are terms of the U. S. Forest Service offer and there are many other terms already stipulated, which would include an agreement that timber be paid for in installments of at least $10,000, that a surety bond of $50,000 guarantee performance and that "substantial deposit" of perhaps $100,000 accompany any bid. Of course, cutting of timber would be rigidly controlled.

Full details of the government offer, illustrations and descriptions of timber, etc., were published in the 1944 North American Review Number of PULP & PAPER INDUSTRY. The Indian case developed—much to the embarrassment of the Forest Service—after the offer was made. The Interior Department-inspired Indian claims have been kept alive by a recent examiner's decision that aboriginal rights may exist to some Alaskan uplands, where the best timber is located. He proposed a Congressional survey of the entire question.

HOW SPECIES ARE USED ON PACIFIC COAST

● The Sloan Commission recently obtained data indicating how the various species are consumed in British Columbia by the four main producing mills, as follows:

Mill—	Hemlock	Spruce	Balsam	Douglas Fir	Cedar	Jack Pine
Sorg Pulp Co.	40%	1%	7%	20%	12%	20%
B. C. Pulp & Paper Co.	83%	1%	16%	----	----	----
Powell River Co.	57%	27%	16%	—	—	—
Pacific Mills	27%	53%	3%	8%	9%	—

As shown by these figures, Sorg has made the most progress in utilizing jack Pine, which is widely prevalent in British Columbia's interior. The possibilities are indicated by the fact that of smaller material (other than sawlog sizes) suitable for pulping under certain processes there is estimated to be 313,288,000 cords of jack pine in British Columbia, compared with less than 85,000,000 cords of hemlock. In fact, there is more jack pine throughout Canada than any other species with the single exception of spruce.

Alaska Forests

Alaska's forests comprise two distinct types. One is the "Coast Forest" which is a coniferous type similar to that found immediately along the coast of Oregon, Washington, and British Columbia. In Alaska it is confined to the southeastern section and a narrow coastal belt extending northwest along 900 miles of shoreline to the mouth of Cook Inlet. The other type is the "Interior Forest" which is of the woodland type. This occupies the greater part of the large central plateau region and is confined chiefly to the bottomlands and lower slopes of the drainages of Cook Inlet and of the Yukon, Tanana, Kuskokwim, and Copper

Rivers. The coast forest has largely been included in the National Forests of Alaska, while the Interior Forest is principally on the open public domain.

Coast Forest

The Coast Forest in Alaska consists chiefly of heavy, dense stands of western hemlock (3-4 f. diameter, 100-140-ft. high) and Sitka spruce (5-7 ft. diameter, 160-200 ft. high). Western red cedar and Alaska cedar are frequently associated with the two principal species, and any of the four may accasionally occur as a pure stand of small extent. In the usual mixed stand, hemlock with some cedar forms a dense main cover and this is overtopped by trees of the more light-demanding Sitka spruce occurring singly or in groups. Bushy saplings of the shade-resisting hemlock and cedars, and various shrubs form a very dense understory.

The commercial forest extends from the edge of tidewater to approximately 1,500 feet elevation where it gives way to stands of dwarfed, thinner trees which are designated "sub-alpine." The commercial forest which occurs largely in fairly narrow bands paralleling the shorelines is broken into large blocks by extensive non-commercial areas of scrub timber and peat muskegs. Good timber rarely extends inland more than five miles. A vast network of sheltered, navigable waterways renders a large part of the area readily accessible, and approximately 75% of the useable timber lies within two and one-half miles of tidewater. The Forest Service claims estimated stand of commercial timber is 84,750,000,000 feet board measure (about 170 million cords). The average stand per acre is about 20,000 board feet, but individual logging units vary widely from this average. Volumes of 40,000 to 50,000 board feet (80-100 cords) per acre frequently occur on small units. The average proportion of species is: western hemlock, 73 per cent; Sitka spruce, 21 per cent; western red cedar, 3 per cent; and Alaska cedar, 3 per cent.

Timber in the coast forest is sold by the U. S. Forest Service at the following minimum stumpage prices: Western hemlock—$1.00 per M feet board measure. Sitka spruce, western red cedar, and Alaska cedar—$1.50 per M feet board measure.

Interior Forest

Although the forests of interior Alaska are of great local value, they do not compare in commercial importance with the forests of the coastal area. They are of the woodland type and resemble the forests of northern Maine and eastern Canada both as to mixture and species. Timber growth is slow, stands are light, and the forest is often patch-like. No extended studies of the interior forest resources have ever been made, but rough estimates indicate an area of 65 to 80 million acres bear trees of such size and quality as to make them of local value for the many needs of an isolated pioneer region, including lumber, mining timbers, and homestead materials. The above mentioned area is considered to have at least 3,500 feet board measure per acre, which gives a total volume of not less than 225,000,000,000 feet board measure (about 450 million cords). The most prevalent type in the interior forest is a mixture of white spruce and Alaska white birch (8 in. to 2 ft. diameter, 50-75 ft. high), with some aspen and balsam poplar.

HERE IS A VIEW OF A FORESTED HILLSIDE IN SOUTHEASTERN ALASKA. This is the area in which the U. S. Forest Service is offering timber for a pulp and paper industry. The launch is used by forest rangers. Timber grows to the water's edge for 9,000 miles along the winding coast, which is broken up by many bays and inlets. This condition would make costs of timber delivery to a mill a favorable consideration. Other views of Alaskan pulp timber were published in last year's North American Review Number of PULP & PAPER INDUSTRY. There is little likelihood of any developments on this proposition until after the war.

B. Frank Heintzleman, U. S. Regional Forester of Alaska, has worked so diligently for a pulp and paper industry in that region that U. S. industry leaders expressed their respect and admiration for his efforts by calling him "Alaska's greatest salesman."

REST OF WORLD--Scandinavian and Russian Resources

The Lumber Unit of the Bureau of Foreign and Domestic Commerce is currently attempting to assemble information on forest resources in various world countries, but it will be some time before their questionnaires have been honored and returned completely. Also, the Forestry and Forest Products Subcommittee of the United Nations Interim Commission has prepared a report on world forest resources. This report has not yet been submitted to and approved by the overall committee, but PULP & PAPER INDUSTRY has been permitted to digest it. Both the Bureau of Foreign and Domestic Commerce, and the United Nations Interim Commission have been handicapped, of course, by the war in gathering and analysis of their material.

Soviet Russia

In the Soviet Union there are vast areas of coniferous forests as yet untouched. While the trees are not as large as those found in many areas of the U. S., they are suited to pulping and are among the best species for that purpose. Utilization is entangled with a number of economic problems, especially as to export.

The Russian forests may become important future factors, but most observers in Washington believe that immediate use will be confined to meeting internal requirements. On the other hand Russian pulpwood has already been coming into North Atlantic ports in quantities which industry men recently dubbed "more interesting than economically significant." No information is available now as to the possibilities of Pacific shipments.

Thomas H. Beck, president of the Crowell-Collier Publishing Company, said in a recent address that the stands of spruce in Siberia are so great that "the United States' whole yearly consumption of wood pulp represents only about 10% of the Siberian timber's annual growth."

A 5-year reforestation plan in Soviet Russia has been proposed, according to the reports from abroad. In the vicinity of Rostov and Stalingrad between the Volga and the Don about 2,225,000 acres of forests and 3,700 acres of tree nurseries were reported destroyed during the war.

Scandinavia

In Sweden and Norway, the cut of timber is rigidly controlled by their governments and these controls seem to function smoothly for these small areas, smaller than many states in the U. S. Their forests are resumably on a perpetual yield basis.

In Sweden, for example, 53.6 million cubic meters of timber were cut in 1937. During the war there was a big increase in use of wood for fuel. To counterbalance this, pulp and lumber use was reduced. As a result, the amount cut in 1943 was reported as only 53 million cubic meters. Even so, enough timber was reported cut or en route or in storage at mills this past winter to keep them running at full capacity for one year.

After that period, the pulp mills, which had a pre-war capacity of about 2½ million tons, may compete more actively with lumber for wood supply, as lumber in rebuilding Europe will be in big demand.

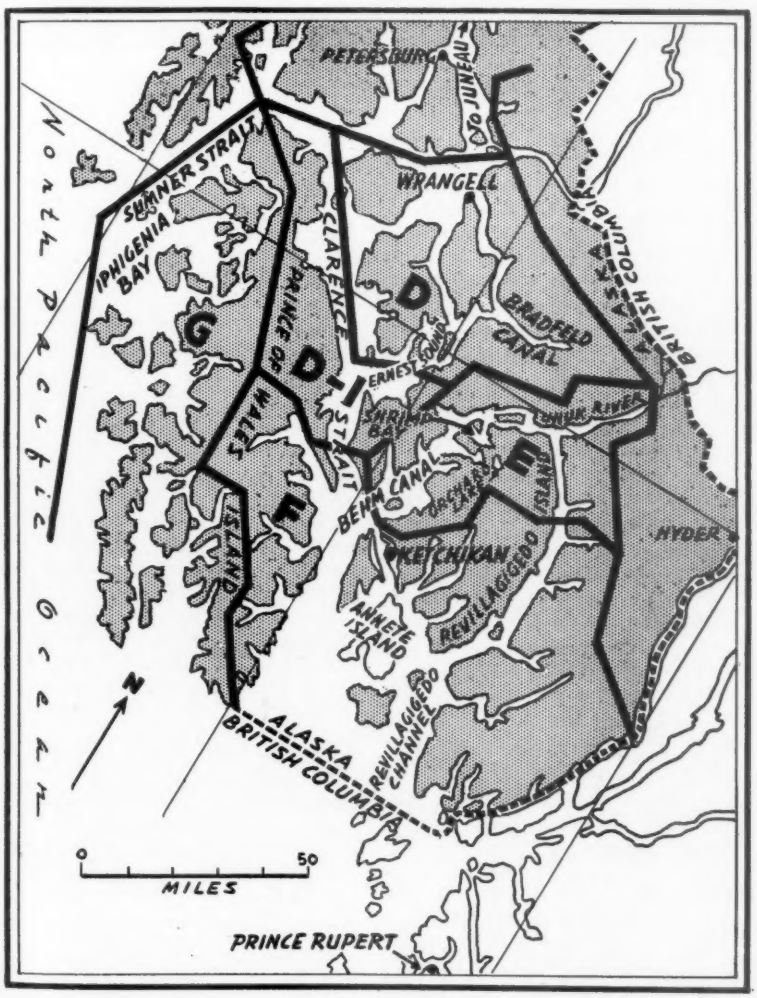
In Norway and Finland the timber resources picture has been less optimistic due to active war demands, and to demands for structural logs and lumber. The U. S. Department of Commerce, reporting on Finland says that the delivery of forest products to the USSR as part of reparations presents no problem because the delivery is well within the capacity of the industry. But there will be serious defects due to government requisitions for fuel wood, and because of low production.

The Latin American countries have no really important timber stands for pulp utilization. They must look to U. S., Canada and Scandinavia for their important supplies.

Certain expansions were attempted in South American production, notably in Brazil. Today Brazil can produce substantial quantities of groundwood sulphite pulp from pine in the State of Parana. It is believed that this unit will enable Brazil to supply most of its own newsprint requirements and some quota of production for other grades. Mexico also will utilize its pine and similar species for an expanding sulphate industry.

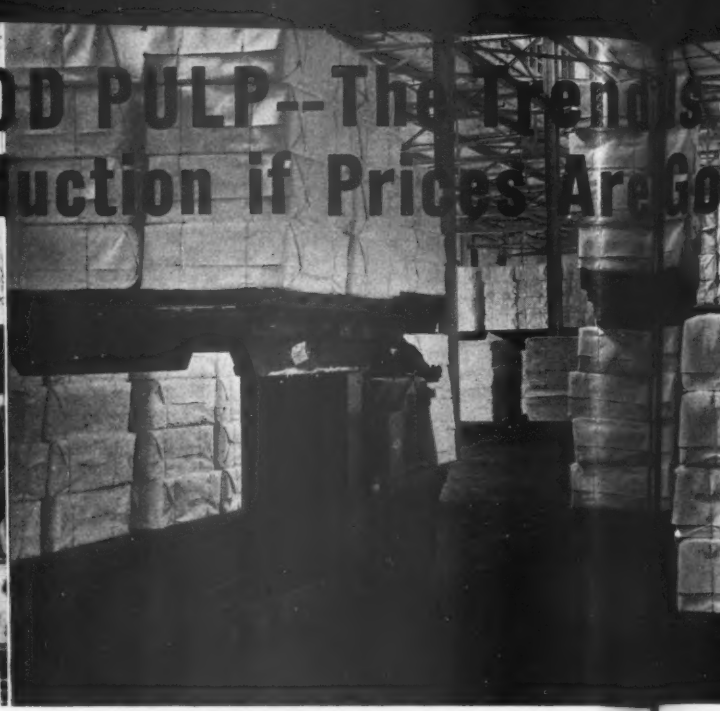
Argentina is producing a large quantity for her own paper requirements, but appears unable to produce wood pulp, largely because the economically accessible forest resources are inadequate.

Chile, with comparatively large timber resources, has made advances in her forest industries. Quantities of pulp and paper are manufactured domestically, but paper is also imported in substantial amounts and so is wood pulp.



THIS MAP SHOWS THE SO-CALLED PULPTIMBER ALLOTMENTS in Southeast Alaska (See pages 57-58). Each one is described by the Forest Service as "self-sustaining" for a pulp and paper mill. Shaded area is southern part of Tongass National Forest.

Allotment F is the one in which U. S. private organizations are chiefly interested, particularly along the east coast of Prince of Wales Island.



OOD PULP--The Trends
toduction if Prices Are Go

TAKING a long look at the future, it is evident that the manner in which the timber resources of North America are husbanded and efficiently utilized will control the ability of the pulp industry to supply postwar demands for paper, rayon and other products.

The pulp mills of U. S. and Canada have performed seeming miracles. Together, they produced 14,450,000 tons of pulp in 1944 compared with 14,220,000 tons in 1943. These figures are substantially more than one million tons off the peak production years of 1941 and 1942, but in view of the critical manpower situation, pulpwood shortages and the failure of waste paper campaigns, it is surprising that there was not a further slump last year, instead of an increase.

End of Allocations Near

Another surprise—this time for the industry—may be the lifting of U. S. pulp allocations after the third quarter of 1945. As this Review Number went to press, PULP AND PAPER INDUSTRY learned on very reliable authority that an early arrival of Swedish pulp was expected to make possible the return of a free market after the third quarter allocations are made.

The requiring of reports on the "end use" forms, however, was expected to continue, probably as long as the Japanese war lasts.

Meanwhile domestic pulp production was edging upward.

Even in the early months of this year, with the manpower problem more acute than ever and the pulpwood inventories of many big mills at lower ebb than they ever have been, the pulp mills were showing a two to three per cent increase in production over 1944. This was truly an herculean achievement.

U. S. PULP SUPPLY AND USE

	(In thousand tons) Average Quarter			2nd Quarter
Wood Pulp	1940	1941	1944	1945
Supply	2,546	2,884	2,784	2,855
Domestic Production	2,240	2,594	2,522	2,592
Imports	306	290	262	263
Wood Pulp Use	2,631	3,006	2,812	2,843
Paper and Paperboard	2,445	2,841	2,622	2,600
Non-paper	65	83	141	182
Export	121	82	49	61

Forest Products Bureau—WPB.

What will be the requirements for pulp and the production capacities after the war? What will be the prices? Many close observers are convinced that the immediate postwar demand will be fantastically high and satisfactory prices will be maintained for at least several years, but the building of new mills and expansion of present facilities may come too late to meet the peak of this demand.

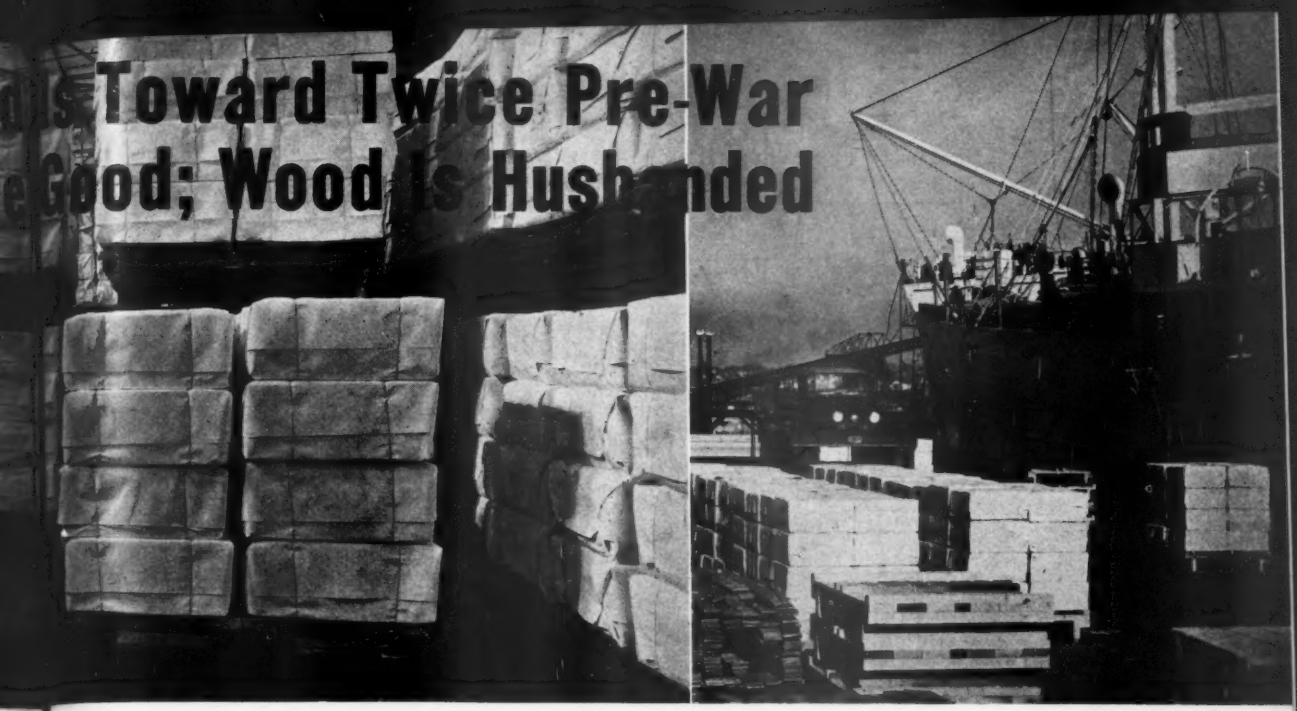
Swedish Pulp

A Department of Commerce forecast estimates that world pulp production after the war, including pulp in storage in Sweden, will be 24,348,000 tons, or more than one-half million tons above the demand. But for the second and third years, only bare surpluses of a little over 100,000 tons are forecast. For the first year, 600,000 tons of stored Swedish pulp was calculated in the production figure and the latest report is that this stored pulp reached 730,000 tons as of last Jan. 1.

When the U. S. paper mills lost their substantial flow of pulp from European countries in Sept. 1939, the U. S. and Canadian pulp mills stepped into the breach and the record shows that they more than made up the loss by reaching record-breaking production figures. These mills are naturally concerned over the postwar possibilities of losing markets to European pulp producers and the U. S. Pulp Producers Assn. has formaly requested the U. S. government to set up automatic controls to counteract any possible unfair competition through depreciation of foreign currencies.

However, E. W. Tinker, executive secretary of the American Paper and Pulp Assn., points out that in the immediate future the full available supply of pulp in Scandinavia cannot be looked upon as potential supply for the domestic mar-

...s Toward Twice Pre-War ...e Good; Wood Is Hus...nded



ket, in view of heavy European demand. Britain has contracted for 300,000 tons of Swedish pulp and there were reports that this substantial amount may be sought by that country.

A great deal of information about the Swedish pulp industry has been learned in the past year. It seems apparent that producers in that country were facing a raw material crisis as the year 1945 approached the midway point. More domestic use of pulp in rayon and paper plants has taken place in Sweden.

Russia, in the world pulp picture, is a question mark. Many of the Finnish mills are now in Russian hands. Assurance is given by U. S. liaison officials in the Department of Commerce that, in any case, Russia will not consider "dumping" pulp and will rapidly make increasing use of its own supply.

However, there is no doubt that Northern Europe eventually will again be a factor of immportance in pulp production. Foreign competitors have the same efficiency in their machines and technique that U. S. and Canadà have; but the wages paid in the Scandinavian countries of Europe, where most of foreign competition has come from, range from ⅓ to ⅕ of the American wages paid in the woods and pulp mills. Also foreign ships' low ocean freight rates to Atlantic and Great Lake ports, during normal peace times, permit European producers to deliver pulp to U. S. markets for about ½ of the freight cost of Pacific Coast producers, who supply normally ¼ domestic pulp sold in our markets.

Miraculous Feat

Preliminary February reports were that U. S. production for 1944 had

UNITED STATES WOOD PULP PRODUCING CAPACITY BY REGIONS 1944

(In tons of 2,000 pounds)

Grade—	New England	Middle Atlantic	Lake States	Pacific	South	Total
Sulphite:						
Bleached	367,570	183,750	405,738	727,760	126,550	1,811,368
Unbleached	239,810	148,860	242,593	464,109	0	1,095,372
Total	**607,380**	**332,610**	**648,331**	**1,191,869**	**126,550**	**2,906,740**
Sulphate:						
Bleached	0	**	124,065***	84,700	662,275	871,040
Unbleached	**	42,850**	256,795	372,675	3,618,334	4,290,654
Total		**42,850****	**380,860*****	**457,375**	**4,280,609**	**5,161,694**
Soda	141,718	159,005	57,400****	****	123,530	481,653
Semi-Chemical	0	0	0	40,200	317,225	357,425
Groundwood	798,220	392,739	457,785	337,680	93,050	2,079,474
TOTAL	1,547,318	927,204	1,544,376	2,027,124	4,940,964	10,986,986

*Exclusive of defibrated and exploded wood pulp, asplund fiber, or screenings.
**New England Unbleached Sulphate included in Middle Atlantic to avoid disclosing one company's data.
***Middle Atlantic Bleached Sulphite included in Lake to avoid disclosing one company's data.
****Pacific Soda Pulp included in Lake to avoid disclosing one company's data.
Source: United States Pulp Producers Association.

UNITED STATES
WOOD PULP PRODUCTION BY REGIONS — 1944

(Tons of 2,000 Pounds)

Region	Total All Grades	Total Sulphite	Bleached Sulphite	Unbleached Sulphite	Total Sulphate	Bleached Sulphate	Unbleached Sulphate	Ground-wood	Soda	Semi-Chemical
West Coast	1,644,531	907,800	558,067	349,733	422,519	55,817	366,702	259,922	**	54,290
New England	1,249,792	505,584	318,282	187,302	40,733**	0	40,773**	562,448	117,508	23,479
Middle Atlantic	672,895	273,673	165,861	107,812	*	*	**	244,585	146,609	8,028
Lake States	1,429,410	601,028	379,937	221,091	362,131*	117,865*	244,266	402,188	43,019***	21,044
South	4,390,638	100,017	100,017	0	3,700,400	619,292	3,081,108	88,538	119,061	38,622
Totals	9,387,266	2,388,102	1,522,164	865,938	4,525,823	792,974	3,732,849	1,557,681	426,197	489,463

*Middle Atlantic Bleached Sulphate included in Lake to avoid disclosing one company's production.
**Middle Atlantic Unbleached Sulphate included in New England to avoid disclosing one company's production.
***Pacific Soda Pulp included in Lake to avoid disclosing one company's production.
Source: United States Pulp Producers Association.

UNITED STATES
WOOD PULP PRODUCTION BY REGIONS — 1943

(Tons of 2,000 Pounds)

Region	Total All Grades	Total Sulphite	Bleached Sulphite	Unbleached Sulphite	Total Sulphate	Bleached Sulphate	Unbleached Sulphate	Ground-wood	Soda	Semi-Chemical
West Coast	1,521,531	895,938	550,078	345,860	333,140	27,568	305,572	245,663	**	37,790
New Englannd	1,308,904	545,706	356,655	189,051	38,685	0	38,685	593,902	125,317	5,294
Middle Atlantic	731,757	281,251	158,717	122,534	46,849*	46,849	*	256,760	144,079	2,818
Lake States	1,317,226	603,763	375,957	227,806	288,923	53,566	235,357	381,255	40,785	2,500
South	4,190,739	116,322	116,322	0	3,539,831	618,252	2,921,579	225,282	109,005	200,299
Totals	9,070,157	2,442,980	1,557,729	885,251	4,247,428	746,235	3,501,193	1,711,862	419,186	248,701

*Unbleached included in New England's total to avoid disclosing one company's data.
**Soda included in Lake States' total to avoid disclosing one company's data.
Source: United States Pulp Producers Association.

UNITED STATES

Paper and Woodpulp Production and Consumption
Consumption of Domestic and Imported Pulpwood and Total Pulpwood Consumption

Year—	PAPER		WOODPULP		CONSUMPTION OF PULPWOOD		
	Production (tons)	Consumption (tons)	Production (tons)	Consumption (tons)	Domestic (cords)	Imported (cords)	Total (cords)
1899	2,167,593	2,158,000	1,179,525	1,216,254	1,617,093	369,217	1,986,310
1904	3,106,696	3,049,824	1,921,768	2,091,006	2,477,099	573,618	3,050,717
1909	4,216,708	4,224,000	2,495,523	2,856,593	3,207,653	793,954	4,001,607
1914	5,270,047	5,496,164	2,893,150	3,556,377	3,641,063	829,700	4,470,763
1917	5,919,647	6,255,725	3,509,939	4,148,600	4,706,327	773,748	5,480,075
1918	6,051,523	6,387,066	3,313,861	3,869,746	4,506,276	744,518	5,250,794
1919	6,190,361	6,479,490	3,517,952	4,113,911	4,445,817	1,032,015	5,477,832
1920	7,334,614	7,846,827	3,821,704	4,696,035	5,014,513	1,099,559	6,114,072
1921	5,356,317	6,053,915	2,875,601	3,344,218	3,740,406	816,773	4,557,179
1922	7,017,800	8,007,088	3,521,644	4,756,105	4,498,808	1,050,034	5,548,842
1923	8,029,482	9,339,573	3,788,672	5,149,695	4,636,789	1,236,081	5,872,870
1924	———	———	3,723,266	5,216,265	4,720,191	1,047,891	5,768,082
1925	9,182,204	10,590,090	3,962,217	5,590,304	5,005,445	1,088,376	6,093,821
1926	———	———	4,394,766	6,096,279	5,489,517	1,276,490	6,766,007
1927	10,002,070	11,915,233	4,313,403	5,960,865	5,526,889	1,224,046	6,750,935
1928	10,403,338	12,447,841	4,510,800	6,239,641	5,750,689	1,409,411	7,160,100
1929	11,140,235	13,347,925	4,862,885	6,704,341	6,411,566	1,233,445	7,645,011
1930	10,169,140	12,314,819	4,630,308	6,463,185	6,089,852	1,105,672	7,195,524
1931	9,381,840	11,403,850	4,409,344	6,005,718	5,896,446	826,320	6,722,766
1932	7,997,872	9,733,764	3,760,267	5,083,446	4,891,424	741,699	5,633,123
1933	9,190,017	10,919,391	4,293,344	6,027,088	5,933,295	628,379	6,561,674
1934	9,186,266	11,185,682	4,281,428	5,969,633	5,822,681	973,978	6,796,659
1935	10,506,195	12,490,886	4,944,226	6,877,869	6,590,942	1,037,332	7,628,274
1936	11,670,000	14,546,046	5,695,219	7,420,829	7,506,156	1,209,760	8,715,916
1937	12,600,000	15,798,362	6,617,184	8,692,489	8,870,932	1,522,868	10,393,800
1938	11,327,000	13,488,300	5,933,060	7,975,000	7,900,053	1,293,938	9,193,991
1939	13,509,642	15,930,349	6,993,334	9,058,415	9,685,592	1,130,874	10,816,466
1940	14,483,709	16,620,632	8,851,740	9,724,643	12,564,180	1,435,820	13,742,958
1941	17,762,365	20,391,412	9,978,400	10,801,223	15,400,000	1,292,640†	16,692,640
1942	17,803,862	19,608,862	10,233,000	11,050,000	15,972,000	1,232,000	17,204,000
1943	17,035,688	19,560,688	9,070,157	10,515,743	15,000,000	1,718,000	16,718,000
1944	17,182,804	19,454,804	10,108,443	10,502,204	14,819,000	1,650,000	16,469,000

Source: Bureau of the Census, United States Forest Service and A. P. & P. A. Bureau Foreign and Domestic Commerce, U. S. Pulp Producers Association.
†Available for nine months of 1941 only. Other 1941 figures estimated for 12 months.
**Due to war measure, figures not available for 1942.

been 10,080,000 tons but late information brought this figure down to 9,387,456 tons. The latter figure —as well as the first—was third higest in U. S. history. It was more than 300,000 tons above the 1943 figure. However, production of over 10,000,000 tons in 1942 and 1941 were higher. The failure to keep manpower drifting from the woods and the slowness with which officialdom came around to the recognition of pulp as a most critical war material are fundamental reasons for the drop that took place in 1942. Officialdom, as constituted in industry control divisions in Washington since that date have regretted the loss of this production. But it has been impossible to get back to 1942 figures, no matter how much it might be desired.

Although having its start during 1939, the prevailing era of heavy wood pulp production in the United States did not get fully under way until 1940, in which year a truly impressive spurt occurred. The forward surge continued until the 1942 mark of 10,783,430 tons was attained, which stands as the all-time record for U. S. pulp production in a twelvemonth period.

We can visualize the tremendous demands that are likely to be made upon the pulpwood resources of the continent when we compare the record wartime pulp production figures

TOTAL UNITED STATES PRODUCTION OF WOOD PULP

By Grades — 1925-1944

(Tons of 2000 pounds)

Year.	Total	Unbleached Sulphite	Bleached Sulphite	Total Sulphate	Groundwood	Soda	All Other
1925	3,962,217	790,510	612,576	409,768	1,612,019	472,647	64,697
1926	4,394,766	911,729	646,466	519,960	1,764,248	496,920	55,463
1927	4,313,403	872,411	680,288	603,253	1,610,409	487,478	59,564
1928	4,510,800	836,751	722,107	774,225	1,610,988	488,641	78,988
1929	4,862,885	848,754	839,953	910,888	1,637,653	520,729	104,908
1930	4,630,308	815,897	751,166	949,513	1,560,221	474,230	79,281
1931	4,409,344	675,859	740,812	1,034,291	1,449,240	374,054	135,088
1932	3,760,267	548,702	596,937	1,028,846	1,203,044	290,703	92,035
1933	4,276,204	601,102	726,473	1,259,351	1,197,553	457,790	33,935
1934	4,281,428	599,905	806,612	1,240,967	1,253,398	477,089	35,457
1935	5,032,299	634,947	944,620	1,467,749	1,355,819	485,162	144,002
1936	5,695,219	693,903	1,127,039	1,794,734	1,475,620	557,695	46,228
1937	6,713,576	791,575	[1]1,348,669	2,139,087	1,600,667	507,548	326,030
1938	5,933,560	601,855	[2]1,004,621	2,443,057	1,333,308	395,307	155,418
1939	6,993,334	729,203	[3]1,217,249	2,962,657	1,444,875	441,565	357,929
1940	8,851,740	990,668	[4]1,601,016	3,725,135	1,762,821	548,047	164,940
1941	10,200,726	1,215,649	1,703,131	4,394,338	1,925,284	617,012	345,312
1942	10,227,720	1,212,354	1,718,192	4,725,133	1,889,607	453,459	228,975
1943	9,070,157	885,251	1,557,729	4,247,428	1,711,862	419,186	248,701
1944	9,387,456	865,938	1,522,163	4,525,823	1,557,681	426,388	489,463

[1]For 1937: "Superpurified" and "Rayon and special grades" combined amounted to 353,640 tons.
[2]For 1938: "Superpurified" and "Rayon and special grades" combined amounted to 228,261 tons.
[3]For 1939 "Superpurified" and "Rayon and special grades" combined amounted to 193,420 tons.
[4]Includes "Superpurified" and "Rayon and special grades" to avoid disclosing figures for individual establishments for 1940.
Source: From 1925 through 1933 and for 1935 through 1941, U. S. Census. 1934, 1942, 1943 and 1944 data from United States Pulp Producers Association.

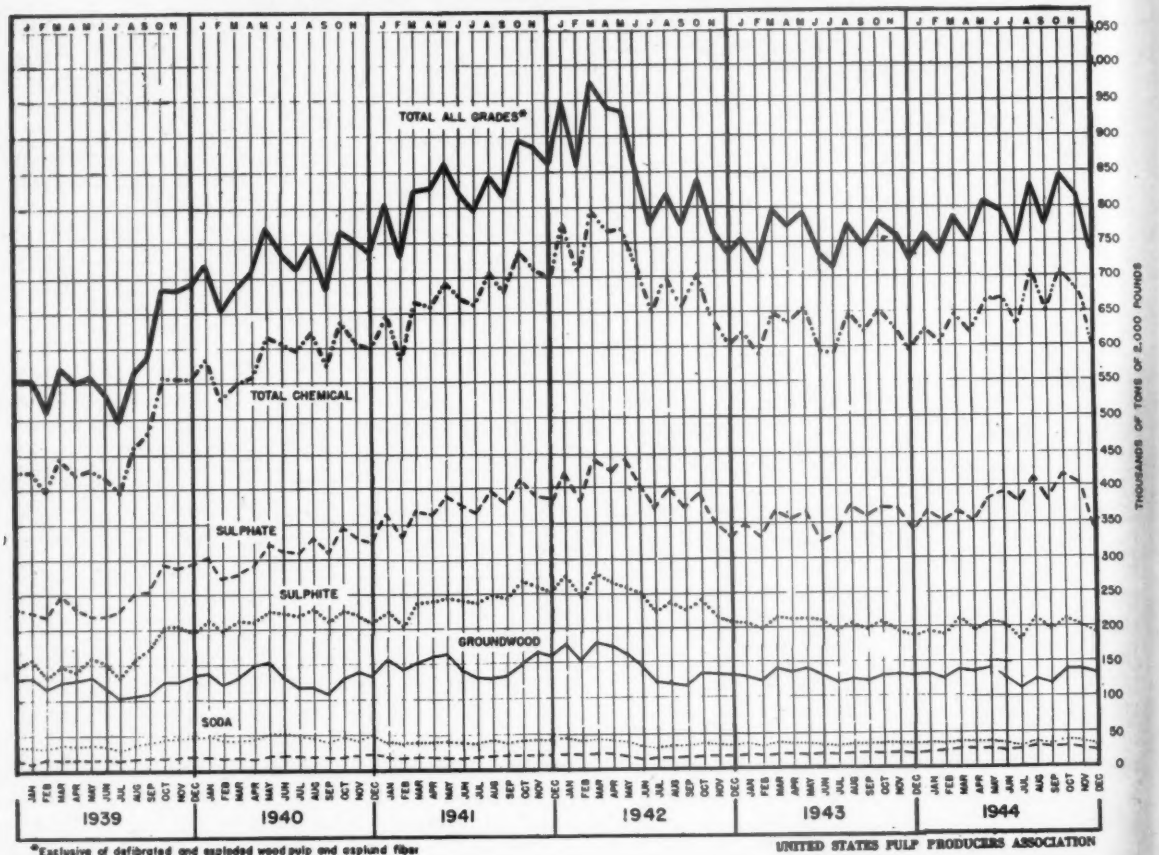
CANADIAN PULP PRODUCTION

(Tons of 2,000 lbs.)

	Mechanical Tons	Sulphite Tons	Sulphate[1] Tons	Total Tons
1920	1,090,114	654,273	188,487	1,922,774
1921	931,560	476,929	131,337	1,539,826
1922	1,241,185	678,878	217,862	2,137,925
1923	1,449,106	749,668	224,812	2,413,586
1924	1,427,782	768,035	218,207	2,414,024
1925	1,621,917	842,785	242,207	2,706,909
1926	1,901,268	995,203	256,074	3,152,545
1927	1,922,124	1,016,060	262,512	3,200,696
1928	2,127,699	1,117,227	256,969	3,501,895
1929	2,420,774	1,236,232	250,104	3,907,110
1930	2,283,130	1,076,804	188,253	3,548,187
1931	2,016,480	941,586	145,156	3,103,222
1932	1,696,021	941,579	144,367	2,781,967
1933	1,859,049	937,313	182,988	2,979,350
1934	2,340,441	1,020,493	205,980	3,566,914
1935	2,458,000	1,025,000	206,000	3,689,000
1936	2,910,338	1,168,927	273,494	4,352,759
1937	3,308,517	1,373,232	312,741	4,994,490
1938	2,650,000	925,000	258,000	3,833,000
1939	2,738,011	1,028,820	313,628	4,080,459
1940	3,305,484	1,480,545	399,267	5,290,762
1941	3,494,922	1,664,516	426,743	5,720,847
1942	3,260,097	1,753,453	459,254	5,472,804
1943	2,998,913	1,712,571	441,421	5,152,905
1944*	3,000,000	1,600,000	470,000	5,070,000

[1]Prior to 1939 the sulphate totals included sulphate pulps only. 1939, 1940 and 1941 sulphate totals include soda and other pulp, according to the Dominion Bureau of Statistics.
*Estimated. For all other years figures are official. 1944 estimates from "Mill Stock Reporter."

UNITED STATES WOOD PULP PRODUCTION



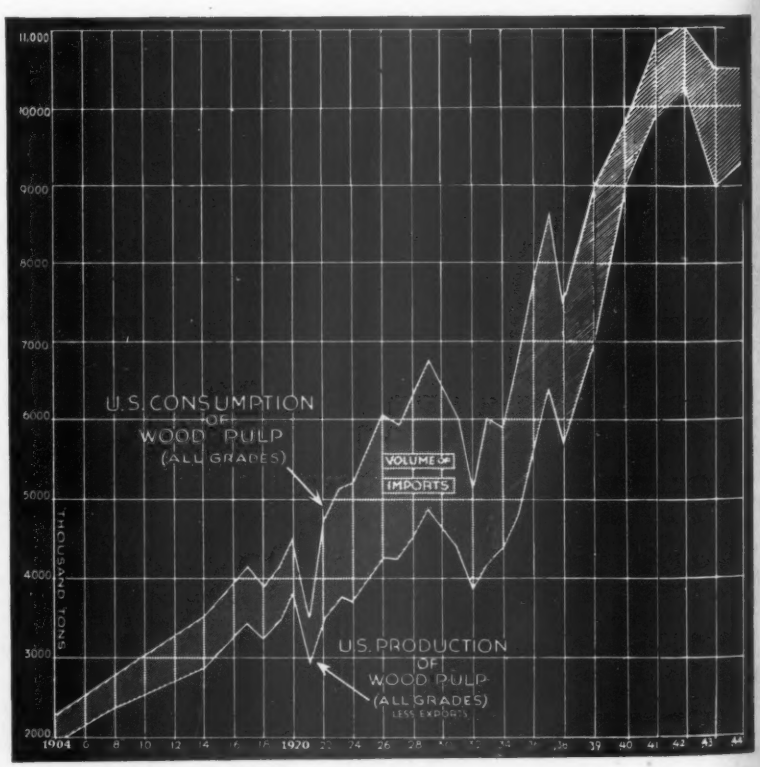
in U. S. and Canada with the pre-war rate of production and the post-war forecasts which have been made.

Before the war, over a period of 15 years, U. S. production had slowly risen from about four to less than 7,000,000 tons annually.

During the ten years prior to the outbreak of war in Europe, or 1929 to 1938 inclusive, annual pulp output in the United States averaged less than 5,000,000 short tons, or to be more exact, 4,956,000 tons, so that the 1944 production was twice the pre-war yearly average total.

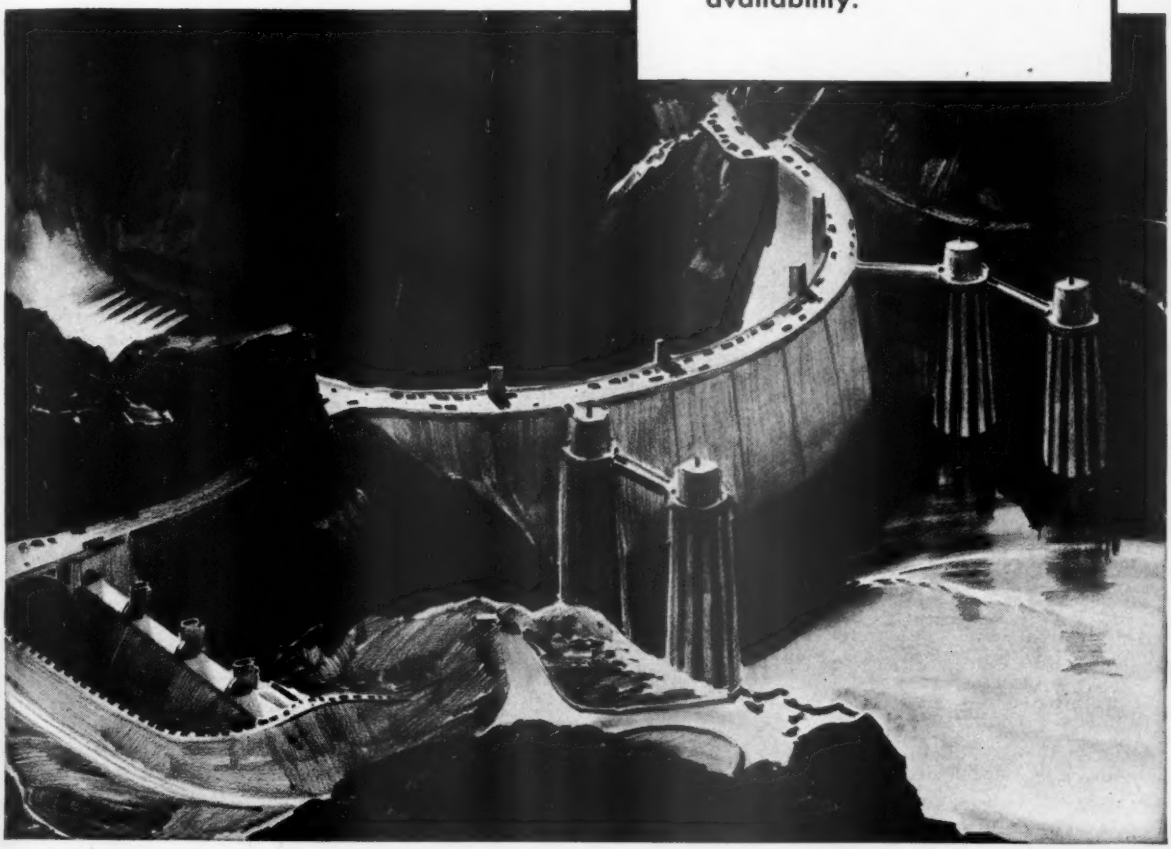
In the Housley report (Jan. 1945 PULP & PAPER INDUSTRY), it is assumed that U. S. production of pulp can be increased to 11,700,000 tons after the war and that one million tons imported from Canada and 660,000 tons from Europe would fill paper and non-paper requirements of this country. This would produce a projected 20,000,000 tons of paper and 500,000 tons of rayon, plastics and other products.

According to the U. S. Pulp Producers Assn., the capacity of U. S. pulp production is less than 11,000,000 tons—not 12,790,000 tons, as



Bear Brand Chemicals for the Western Paper Industry

• Many of the West Coast's largest paper mills prefer Bear Brand Chemicals because of the dependable uniformity they offer, and because of their ready availability.

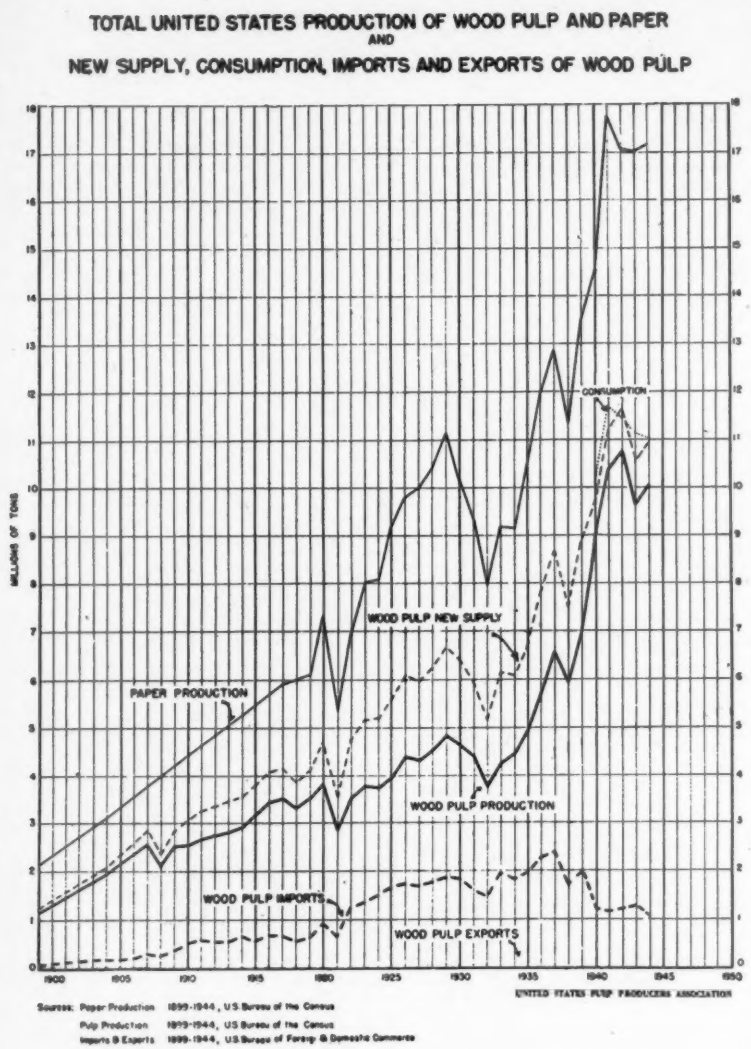


Boulder Dam

Ammonia Chlorine • Caustic Soda • Sulphur Dioxide
Zinc Hydrosulphite

GREAT WESTERN DIVISION
THE DOW CHEMICAL COMPANY
Seattle SAN FRANCISCO, CALIFORNIA Los Angeles

GREAT WESTERN DIVISION • THE DOW CHEMICAL COMPANY • BEAR BRAND PRODUCTS
DOW
CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY



assumed in the Housley report and which is based on quarterly peak production rates in 1941-42 and machinery added since then.

All during 1944 and in early 1945 the U. S. was on a hand-to-mouth basis as to both production and consumption of wood pulp. Logs and pulpwood were converted into pulp as rapidly as they reached the mills; as fast as pulp was made, it was converted into paper, paperboard, rayon and gunpowder. With pulp inventories next to non-existent, consumption was determined not by needs but by the new supply provided by production and imports. Civilian requirements were met only to the extent possible after military demands had been satisfied.

"If we learned nothing else in 1944," said Fred G. Stevenot, president of Puget Sound Pulp & Timber Co., "we learned the uncertainty, the unpredictability, of military requirements. This applies to products of wood pulp as well as to guns and gunpowder and all classes of fighting equipment and material. We also learned, let us hope, that nothing is to be gained by premature optimism, by figuring on the return of the day of plenty for civilians before complete military victory on all fileds of battle is an accomplished fact. This, too, applies to the present pulp and paper shortage.

"No relief from the hand-to-mouth basis of 1944 is yet in sight. We must not be lulled into a false sense of security, or of plenty, just because the morning newspaper continues to makes its daily appearances on our doorstep, or just because we have some writing and wrapping paper. If we are to continue to have such things, every form of pulp and paper conservation must be practiced by everyone."

This statement was substantially still true in mid-1945, even though estimated wood pulp supply was somewhat higher in the second quarter of 1945 than in the average quarter of 1944 and the programmed use in the second quarter of 1945 was 2,855,000 tons—an increase of 71,000 tons over the corresponding 1944 allocation.

Sources of Fiber

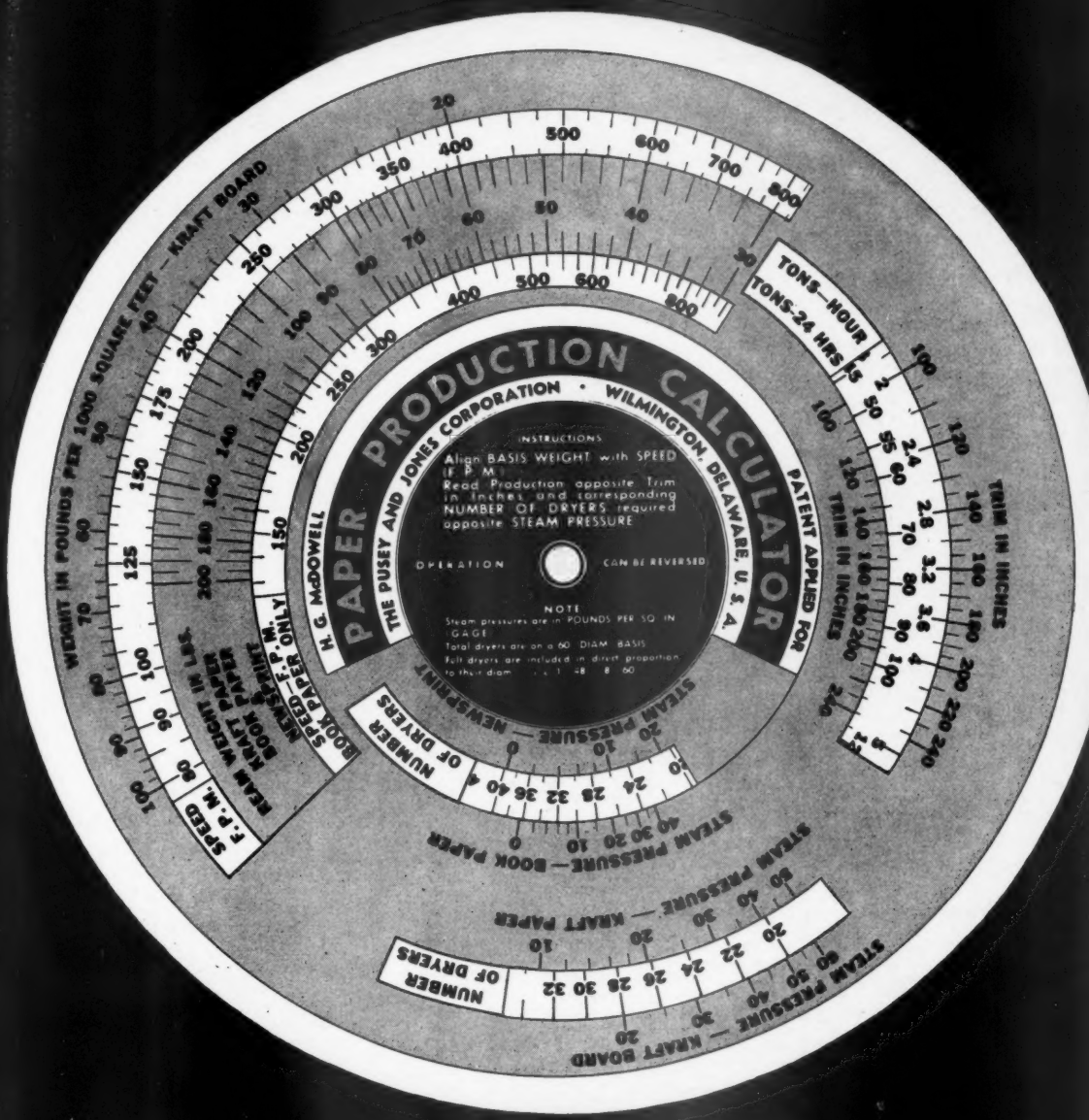
There is another important consideration in estimating how far available pulpwood will go and how much paper will be made from the pulp of North America. That is the inevitable trend of paper mills back to use of more wood pulp in given amounts of paper. After the war, competition and the opportunity to improve quality of paper are bound to reverse the wartime trend of increased use of other fibrous materials, in place of scarce wood pulp.

In U. S. paper mills, other fibrous materials used in paper to-

REGIONAL PERCENTAGES OF UNITED STATES WOOD PULP PRODUCTION
Total and by Grades in 1942, 1943 and 1944

Region	Sulphite			Sulphate			Groundwood			Soda			Total		
	1942	1943	1944	1942	1943	1944	1942	1943	1944	1942	1943	1944	1942	1943	1944
New England	22	22	21	*	1	*	34	35	36	28	30	28	14	14.5	13
Middle Atlantic	10	11.5	12	2.5	1	2*	16	15	16	34	34	34	8	8	8
Lake States	22	25	25	6.5	7	7	22	22	26	13**	10	10**	14	14.5	14.5
South	5	5	4	82	83	82	12	13	5	25	26	28	45	46	47
West Coast	41	36.5	38	9	8	9	16	15	17	**	**	**	19	17	17.5
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

*Unbleached sulphite produced in New England combined with Middle Atlantic production to avoid disclosing one company's data.
**Soda produced on West Coast combined with Lake States production to avoid disclosing one company's data.
Source: United States Pulp Producers Assn.


PAPER PRODUCTION CALCULATOR
THE PUSEY AND JONES CORPORATION · WILMINGTON, DELAWARE, U. S. A.
PATENT APPLIED FOR
H. G. McDOWELL
INSTRUCTIONS
Align BASIS WEIGHT with SPEED (F. P. M.)
Read Production opposite Trim in Inches, and corresponding NUMBER OF DRYERS required opposite STEAM PRESSURE
OPERATION
CAN BE REVERSED
NOTE
Steam pressures are in POUNDS PER SQ. IN. GAGE
Total dryers are on a 60" DIAM. BASIS
full dryers are included in direct proportion to their diam
WEIGHT IN POUNDS PER 1000 SQUARE FEET — KRAFT BOARD
BOOK PAPER
NEED F. P. M. ONLY
SPEED F. P. M.
REAM WEIGHT IN LBS.
BOOK PAPER
KRAFT PAPER
TONS—HOUR
TONS-24 HRS
TRIM IN INCHES
NUMBER OF DRYERS
STEAM PRESSURE — NEWSPRINT
STEAM PRESSURE — BOOK PAPER
STEAM PRESSURE — KRAFT PAPER
STEAM PRESSURE — KRAFT BOARD

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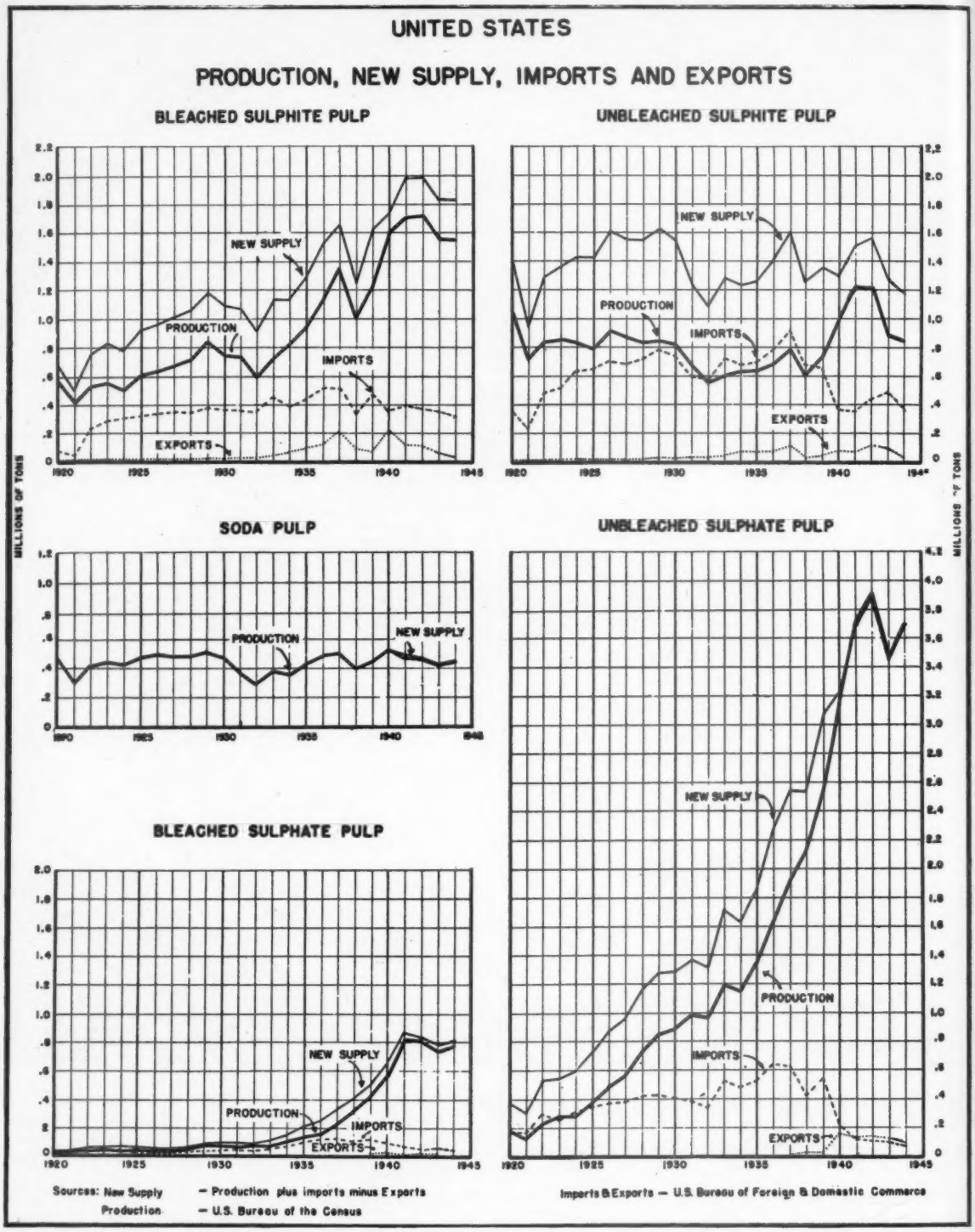
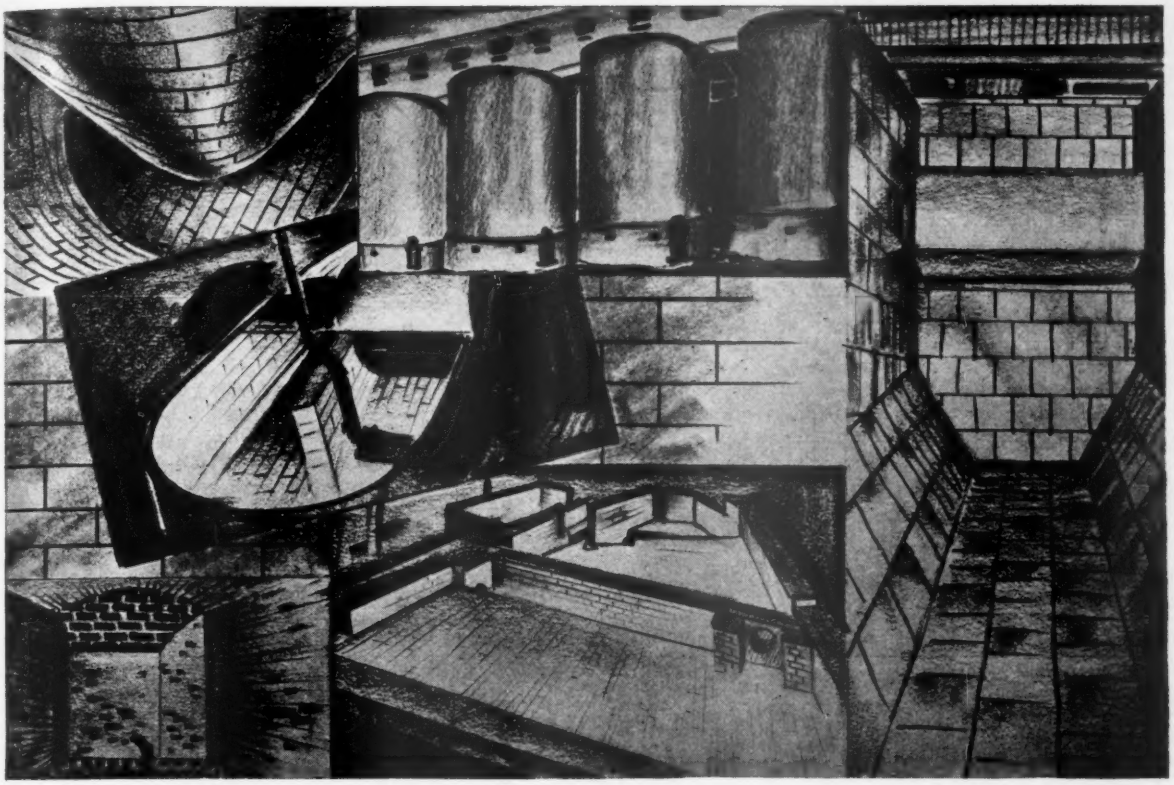


taled only 5,711,069 tons in 1940, but rose steadily to 8,244,558 tons in 1944 and would have been even more if the waste paper drives had been as successful as hoped for. In that period U. S. wood pulp consumption — production and Canadian imports less exports — rose from 9,781,739 tons to 10,502,204 tons. Paper production rose from 14,483,709 to 17,182,804 tons.

Rayon and non-paper demands for pulp likewise have steadily risen but are still representative of comparatively small fields for pulp (see rayon and plastics departments in this issue). Offsetting this drain on pulp after the war, will be the return of seven mills now devoting their production entirely to pulp for smokeless powder to pulp for market. By mid-1945, use of pulp for



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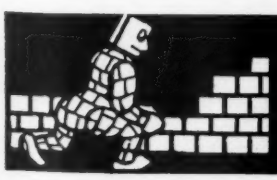

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all non-paper uses had tripled 1940 figures.

Canadian Pulp

An interesting feature in the production figures for last year is that U. S. output of pulp of all classes was approximately nine times the total amount of pulp of all grades imported into the United States during 1944—supposedly entirely from Canada and Newfoundland. In prewar years, the statistical records reveal, importations of chemical wood pulp comprised approximately 27% on an average, or more than one-quarter, of the pulp made available and consumed in the United States.

Although at the beginning of this article, we pointed out that U. S. and Canada together had manufactured more pulp in 1944 than 1943, the Canadian production alone declined very slightly, according to an estimate of Daily Mill Stock Reporter.

More important was the fact that, despite the most difficult conditions, increasing each year in their stringency, the Canadians have performed the phenomenal feat of more pulp in each year of the war than it had in any prewar year. Canada—in the war in 1939—produced 4,058,000 tons of pulp in that year. But in each succeeding year it has produced more than 5,000,000 tons. The peak figure was 5,586,181 tons in 1941. In each year since then, there has been a slight decline, but it was still over that proud five million figure in 1944, if the Stock Reporter's 5,070,000 tons estimate is correct.

The decrease during 1944 was in sulphite grades of pulp, production of sulphate showing a rise over the year preceding, and mechanical pulp output holding its own comparable with 1943.

Since the beginning of World War II export of wood pulp from Canada has increased steadily to new heights, especially in the various grades of chemical pulp, which reached 1,259,670 tons and a valuation of $89,486,869 in 1943—year of latest official figures. In that

WOOD PULP PRODUCTION, CONSUMPTION, IMPORTS, EXPORTS
UNITED STATES
1944

(In tons of 2,000 pounds)

Grade—	Consumption*	Production	Imports	Exports
Sulphite:				
Bleached	1,818,163	1,522,163	325,000	29,000
Unbleached	1,220,938	865,938	391,000	36,000
Total	3,039,101	2,388,101	716,000	66,000
Sulphate:				
Bleached	848,974	792,974	62,000	6,000
Unbleached	3,710,849	3,732,849	83,000	105,000
Total	4,559,823	4,525,823	145,000	111,000
Soda	435,388	426,388	17,000	8,000
Groundwood	1,739,681	1,557,681	182,000	.....
TOTAL	9,773,993	8,897,993	1,060,000	184,000

Source: Estimated for 100 per cent of the industry by the United States Pulp Producers Association.
*Estimated on the basis that consumption equals production and imports, minus exports. Figures do not include semi-chemical and off-quality grades.

WOOD PULP PRODUCTION, CONSUMPTION, IMPORTS, EXPORTS
UNITED STATES
1943

(In tons of 2,000 pounds)

Grade—	Consumption*	Production	Imports	Exports
Sulphite:				
Bleached	1,859,855	1,557,729	361,708	59,582
Unbleached	1,293,453	885,251	480,297	72,095
Total	3,153,308	2,442,980	842,005	131,677
Sulphate:				
Bleached	799,840	746,235	62,000	8,395
Unbleached	3,477,970	3,501,193	91,139	114,362
Total	4,277,810	4,247,428	153,139	122,757
Soda	434,078	419,186	19,892	5,000
Groundwood	1,924,942	1,711,862	213,370	290
TOTAL	9,790,138	8,821,456	1,228,406	259,724

Source: Estimated for 100 per cent of the industrry by the United States Pulp Producers Association.
*Estimated on the basis that consumption equals production and imports, minus exports. Figures do not include semi-chemical and off-quality grades.

ESCO

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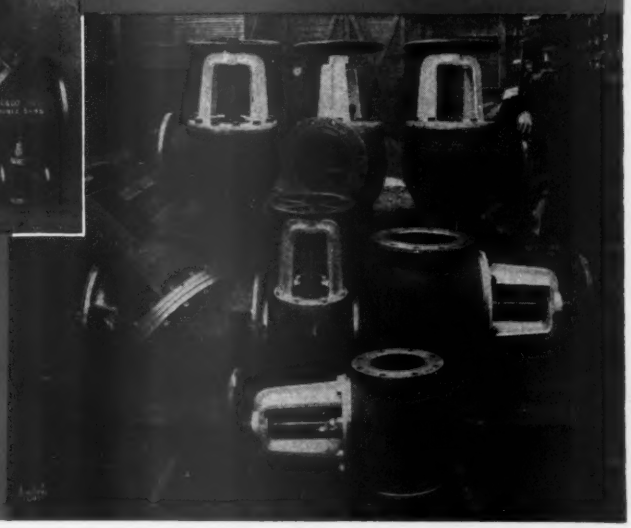

Two typical assortments of ESCO stainless steel valves engineered and produced to suit exacting specifications of pulp mill service.

It is neither through accident nor luck that the name *ESCO* has become a "household" word in the Pulp Industry synonymous with highest quality stainless steel specialty equipment, and superior engineering service. It comes about rather as a result of *ESCO's* pioneering research and early work in introducing stainless steel to the pulp mills where a corrosion resisting material was long sought and badly needed.

Over many years since then, *ESCO* engineers and production men have worked intimately with the technical problems of pulp mills and have become highly specialized in this field. An ever increasing background of experience and skill gained thus through time, research and work results today in the universally recognized quality of products bearing the *ESCO* name.

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year total pulp exports amounted to 1,556,456 tons, valued at $100,012,775. This was made up of 465,946 tons of bleached sulphite ($37,528,067), 590,541 tons of unbleached sulphite ($36,997,343), 183,291 tons of sulphate pulp ($13,516,667), 272,900 tons of groundwood ($10,068,592), 19,892 tons of other pulp ($1,444,792) and 23,886 tons of screenings $457,314).

In 1943 the United States took 78.2 per cent of Canada's bleached sulphite exports, 82.3 per cent of unbleached sulphite exports, 84.4 per cent of sulphate pulp exports, 80.8 per cent of mechanical pulp, 97.9 per cent of screenings, and all other pulp.

STOCKS OF WOOD PULP OF OWN PRODUCTION
Held by United States Wood Pulp Producers
(In Tons of 2,000 Lbs.—Does not include purchased pulp)

	January 1, 1944		December 31, 1944	
	For Own Use	For Market	For Own Use	For Market
Total All Grades*	56,085	5,637	55,850	10,997
Total Sulphite	13,709	4,546	12,389	8,141
Bleached Sulphite	6,692	3,893	5,071	7,290
Unbleached Sulphite	7,017	653	7,318	851
Total Bleached Sulphate	3,548	0	4,136	26
Total Unbleached Sulphate	7,690	290	9,706	939
Total Soda	2,457	313	1,874	464
Semi-Chemical	72	0	72	0
Groundwood	26,480	182	25,438	142
Screenings	2,235	1,285	2,129	306

Source: As reported to the United States Pulp Producers Association.
*Exclusive of defibrated and exploded wood pulp and asplund fiber.

SUMMARY FOR 1944 OF UNITED STATES WOOD PULP PRODUCTION, SHIPMENTS *and* STOCKS
(Tons of 2,000 lbs., air dry weight)

		Shipments		Stocks on Hand End of Period	
	Production	Used*	Domestic Market	Export	12/31/44	1/1/44
Total All Grades, 1944*	9,387,266	7,703,586	1,495,015	183,540	66,847	61,722
Total Bleached Sulphite	1,522,164	742,330	749,316	28,742	12,361	10,585
Total Unbleached Sulphite	865,938	635,974	193,724	35,741	8,169	7,670
Total Bleached Sulphate	792,974	686,461	99,611	6,288	4,162	3,548
Total Unbleached Sulphate	3,732,849	3,347,254	277,937	104,993	10,645	7,980
Total Soda	426,197	322,161	96,692	7,776	2,338	2,770
Semi-Chemical	307,619	306,918	701	0	72	72
Groundwood	1,557,681	1,508,708	50,055	0	25,580	26,662
Total Screenings	181,844	153,780	26,979	0	3,520	2,435

*Covers only pulp manufactured by producing mills or transferred to their subsidiaries. Does not include purchased pulp.
**All grade of wood pulp except defibrated, exploded and asplund fiber.
Source: As reported to the U. S. Pulp Producers Association by all chemical pulp producing companies and 99% of the groundwood pulp producing companies.

SUMMARY FOR 1943 OF UNITED STATES WOOD PULP PRODUCTION, SHIPMENTS *and* STOCKS
(Tons of 2,000 lbs., air dry weight)

		Shipments		Stocks on Hand End of Period	
	Production	Used*	Domestic Market	Export	12/31/43	1/1/43
Total All Grades, 1943	9,070,157	7,579,474	1,313,067	260,326	61,384	143,993
Total Bleached Sulphite	1,557,729	798,604	710,340	59,582	10,585	21,382
Total Unbleached Sulphite	885,251	628,756	194,311	72,095	7,670	17,581
Total Bleached Sulphate	746,235	689,951	53,296	8,395	3,548	8,955
Total Unbleached Sulphate	3,501,193	3,217,982	211,119	114,362	7,980	50,250
Total Soda	419,186	327,011	87,944	5,000	1,770	3,539
Semi-Chemical	231,874	231,920	35	0	72	153
Chemical Screenings	13,979	6,354	7,026	602	1,738	1,741
Groundwood	1,711,862	1,675,659	48,859	290	26,678	39,624
Groundwood Screenings	2,848	3,136	137	0	343	768

Source: United States Pulp Producers Association.
*Covers only pulp manufactured by producing mills or transferred to their subsidiaries. Does not include purchased pulp.

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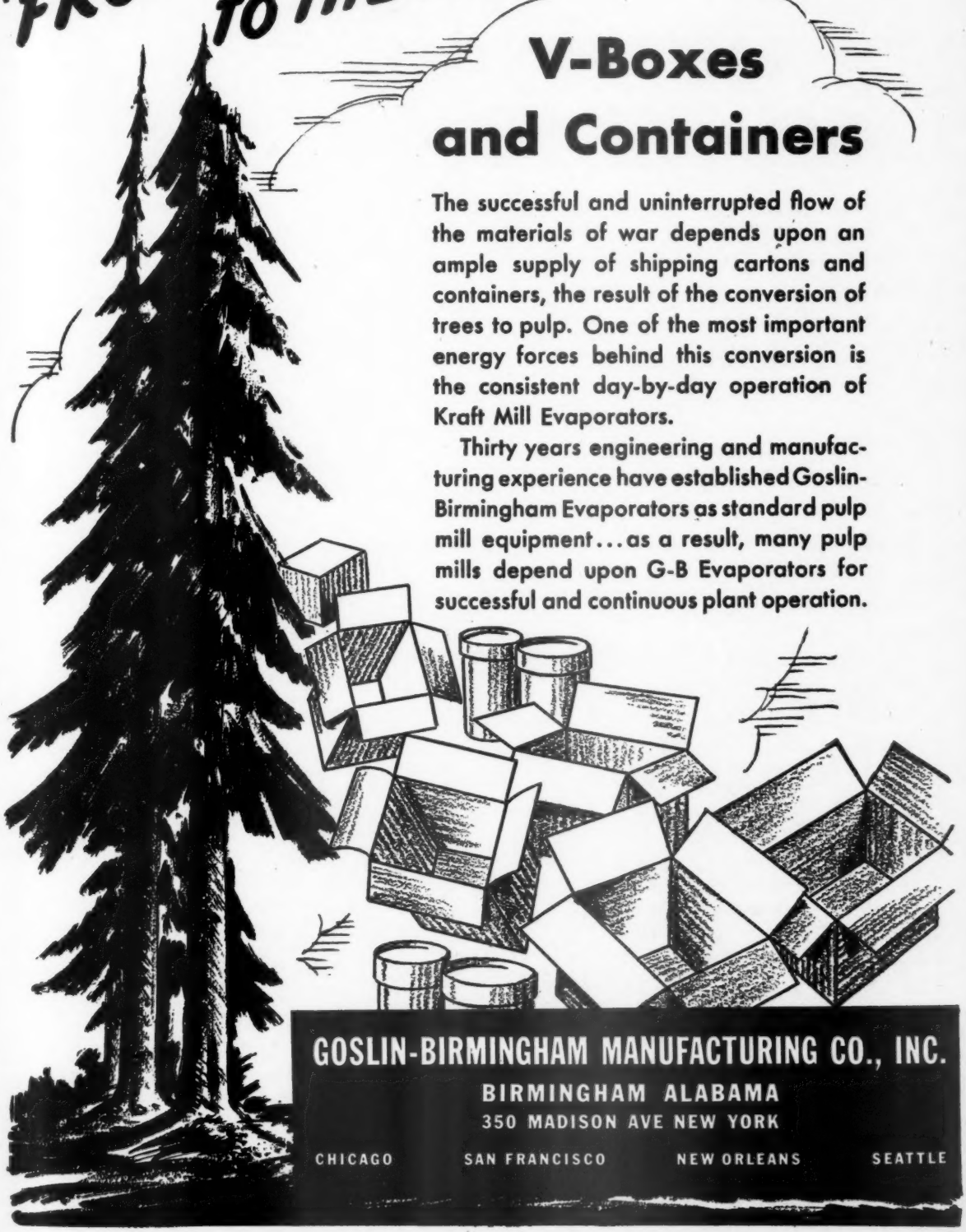
The successful and uninterrupted flow of the materials of war depends upon an ample supply of shipping cartons and containers, the result of the conversion of trees to pulp. One of the most important energy forces behind this conversion is the consistent day-by-day operation of Kraft Mill Evaporators.

Thirty years engineering and manufacturing experience have established Goslin-Birmingham Evaporators as standard pulp mill equipment... as a result, many pulp mills depend upon G-B Evaporators for successful and continuous plant operation.



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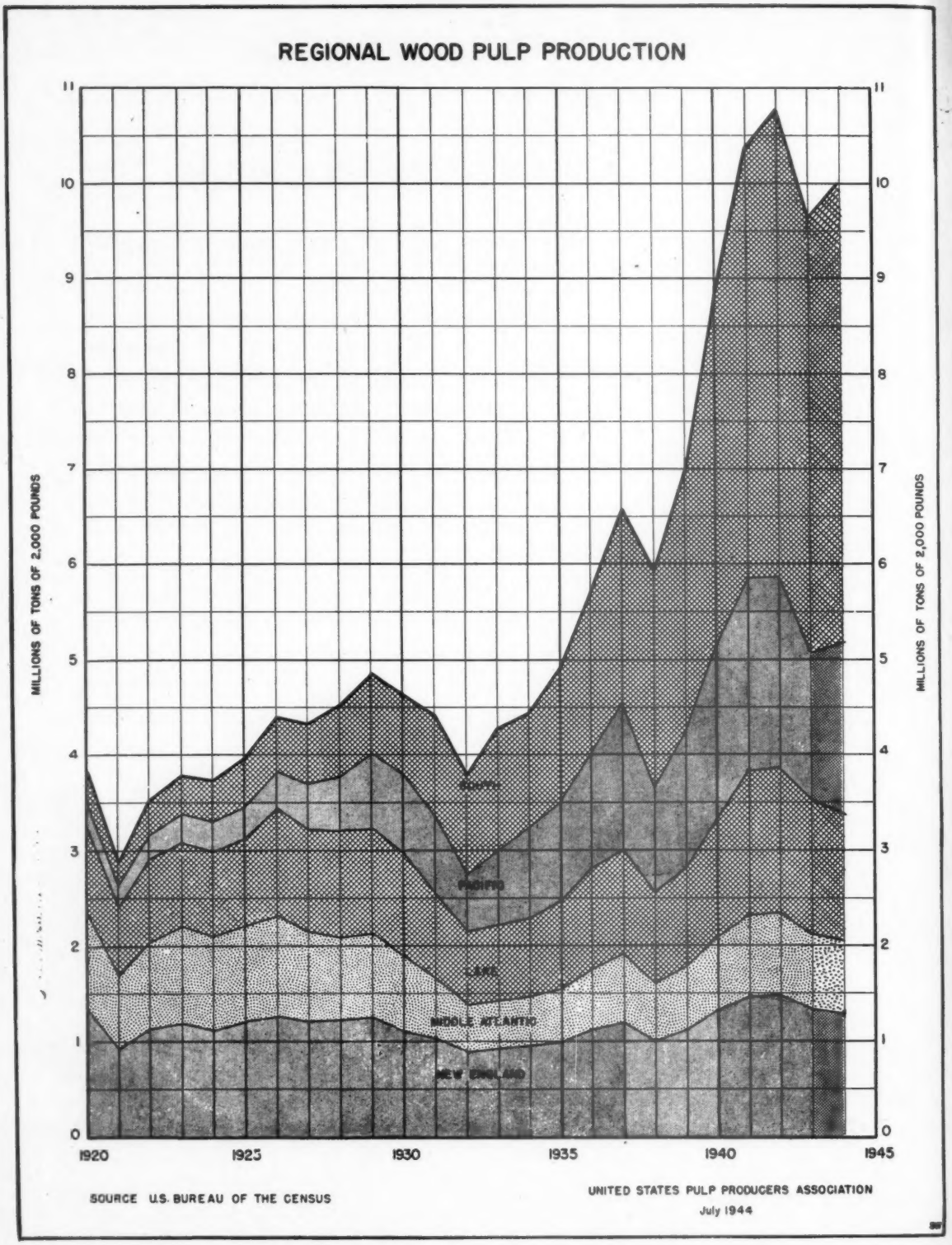

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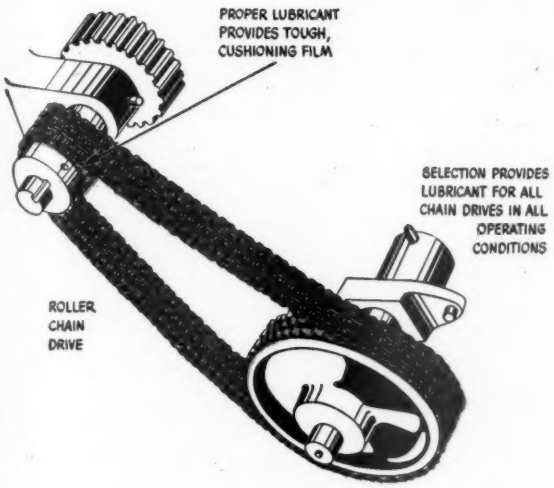
STANDARD ENGINEERS NOTEBOOK

VOL. 2 PA No. 1

Correct lubricant reduces chain drive wear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On a worm or exposed roller and block chain, Calol Pinion Grease—0 is recommended for high operating temperature, Calol Roller Oil—X for medium and Calol Journal Oil—135 for low. For enclosed chains of this type, Calol Journal Oil—165, —135 and —35.

For chains exposed to pitch, resinous materials, etc., special Calol Drier Chain Oil is recommended.

Recommendations for silent chain drives are as follows: Worn, exposed chains: Calol Roller Oil—X, high temperature; Calol Journal Oil—135, medium temperature; Calol Journal Oil—35, low temperature. New, exposed chains or oil-bath-lubricated encased chains: Calol Journal Oil—135, —35 and —25. Splash-lubricated, encased chains: Calol Journal Oil—35, —25 and —14.

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Calol Turbine Oil—19 is solvent refined and filtered. It is a heavy-bodied oil—about SAE 30 grade. In the Paper Mill Industry, it is used on the bearings of Beater and Jordan fans, Dryers and Felt Rolls, and Calendars. It is also used in many industries for the bearing lubrication of large and medium-sized stationary Diesel engines, large, slow-speed stationary steam engines and double-reduction-geared steam turbines.

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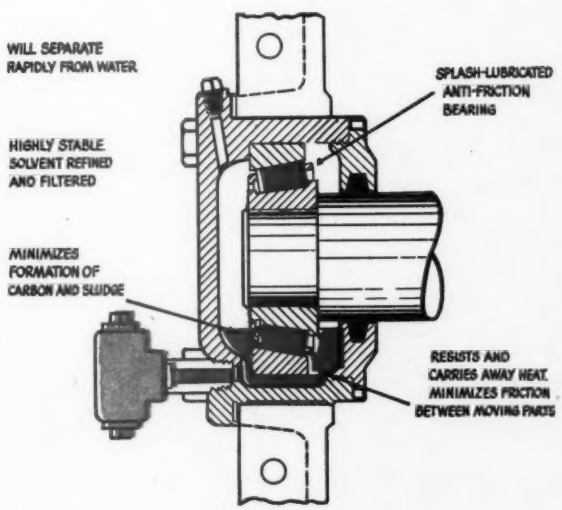
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STANDARD OF CALIFORNIA

KRAFT PULP--Where To?

There have been a great many responsible men in the pulp and paper industry who have said, in effect, that the "future" of the industry will be in the kraft or sulphate field. Of course, that is too simple a generalization, but it does testify to the possibilities in kraft pulp and paper.

There will be a place for pulps and certain timber will be best utilized in the manufacture of other pulps, but the kraft branch of the industry has still to reach the point where supply equals demand—in all its history it has never reached that mark.

New mills building or to be built in the South, Ontario, the Pacific Coast and Northeast United States (where improved kraft processes have opened up a new economic use for the hardwoods of that region) may add upwards of 2,000 tons a day to North American kraft pulp production after the war.

Martin Williams, of the University of Alabama, in a study of the American kraft industry, looks toward an annual U. S. kraft pulp capacity by 1950 of 7,000,000 tons.

Latest revised figures show practically all of the U. S. gain in pulp production in 1944, over 1943, was in kraft. A total of 4,525,823 tons of kraft pulp was made in 1944, an increase of about 278,000 tons over

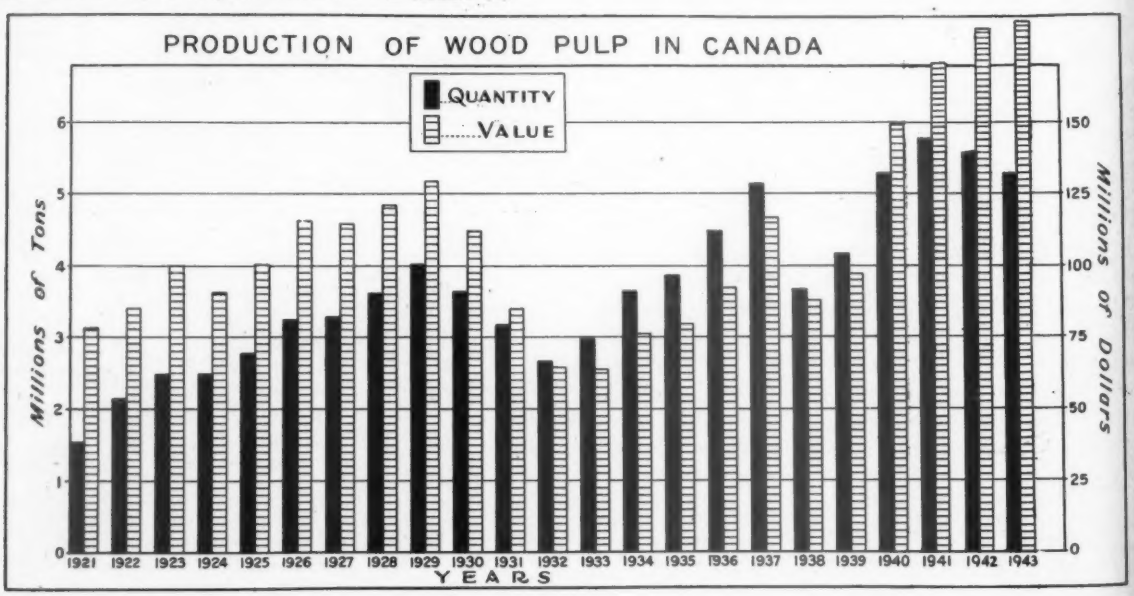
U. S. CONSUMPTION OF WOOD PULP AND OTHER FIBROUS MATERIALS IN MANUFACTURE OF PAPER AND PAPERBOARD

Type of material:	Consumption in tons of 2,000 pounds 1940	1941	1942	1943(2)	1944(1)
All types	15,492,808	18,856,286	17,857,930	18,199,442	18,746,762
Wood pulp, total	9,781,739	11,363,600	11,038,020	10,635,320	10,502,204
Mechanical, total	2,138,988	2,565,189	2,453,171	2,400,142	2,387,420
Groundwood	1,862,575	2,218,808	1,926,099	1,760,866	1,726,487
Defibrated, exploded, asplund fiber & similar grades	276,413	346,381	527,072	639,276	660,933
Sulphite, total	2,906,794	3,348,476	3,079,227	2,891,719	2,518,590
Unbleached	1,348,951	1,543,146	1,581,152	1,449,419	1,241,966
Bleached	1,557,843	1,805,330	1,498,075	1,442,300	1,276,624
Sulphate, total	3,964,729	4,613,905	4,632,640	4,430,098	4,588,463
Unbleached	3,292,130	3,710,405	3,801,610	3,583,851	3,718,631
Semi-bleached	178,405	207,884	164,384	163,066	156,085
Bleached	494,194	695,616	666,646	683,181	713,747
Soda, total	531,581	515,389	468,661	455,892	418,442
Semi-chemical, off quality screenings, etc.	239,647	320,641	404,321	457,469	589,289
Other fibrous materials, total	5,711,069	7,492,686	6,819,910	7,564,122	8,244,558
Waste paper	4,667,502	6,075,129	5,494,959	6,367,854	6,859,332
Rags	402,600	529,976	480,614	425,910	427,837
Straw	491,821	666,493	516,087	488,266	556,714
Manila fiber, old rope	20,187	27,396	28,205	12,921	9,103
Other fiber	128,959	193,692	300,045	269,171	391,572

Source: Compiled by the Bureau of the Census from the reports received from the Pulp Allocation Office, U. S. War Production Board.

(1) Includes estimates of materials consumed by 22 mills which did not submit monthly reports for one or more months during 1944. The estimates were made for each mill by computing the ratio of materials consumed to paper and paperboard produced for all months for which such information was available, and applying these ratios to reported paper and paperboard production in months for which consumption data were not reported. The proportion of estimate for all types of materials, with the exception of manila and old rope (5.0 per cent), was less than one per cent.

(2) Includes estimates for materials consumed by 71 mills which did not sul it monthly reports for one or more months during 1943. The estimates were made in the same nanner as outlined in footnote (1).



Values for Canadian woodpulp in recent years have pushed over the top of this chart.

Figures for recent years (official): 1941 — Production, 5,720,847 tons, valued at $175,439,551; 1942—5,606,461 tons, $192,145,062; 1943—5, 272,830 tons, $194,434,202.

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1943. Slight declines in sulphite and groundwood were offset by slight gains in soda and other processes.

Mr. Williams' figure for 1950 would constitute a tremendous advance. But there seems no limit to the qualites of pulp and paper that can be made in the South or anywhere in the kraft industry. One important possible deterrent to reaching his goal would be the price and quantity as well as quality of Scandinavian kraft pulp. Another might be a reversal of high war demands for packaging paper.

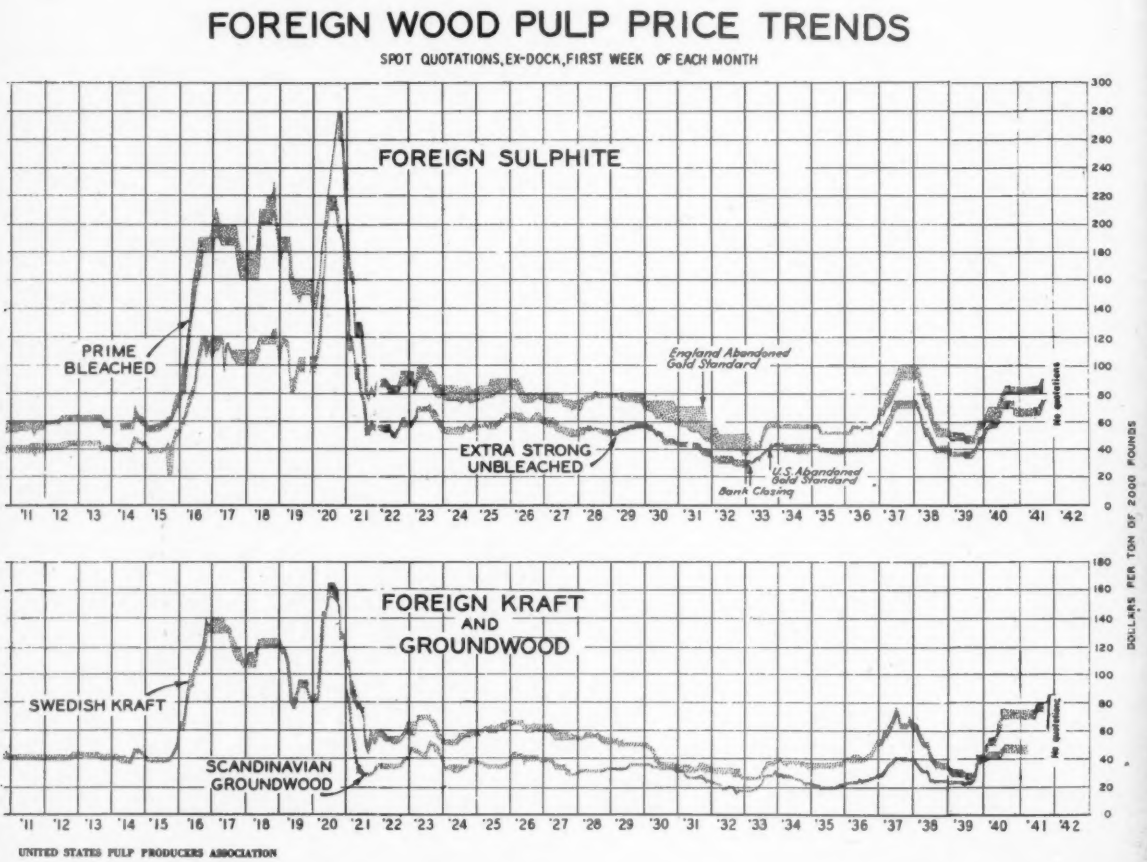
Mr. Williams points out that whereas in 1919 the percentage of American-made kraft pulp was 3.4%, by 1943 45% of all pulp made in the United States was kraft. In 1935 United States mills produced 1,500,000 tons of kraft compared with 4,394,338 tons in 1941. Until 1939 a large part of kraft pulp was imported because consumption increased faster than production capacity. In 1926 about 53% of kraft consumed by United States mills originated abroad in 1929, 33% — in 1936, 29% — and in 1943, 3.5%. United States kraft exports, on the other hand, have been negligible, reaching a high of 3% in 1940.

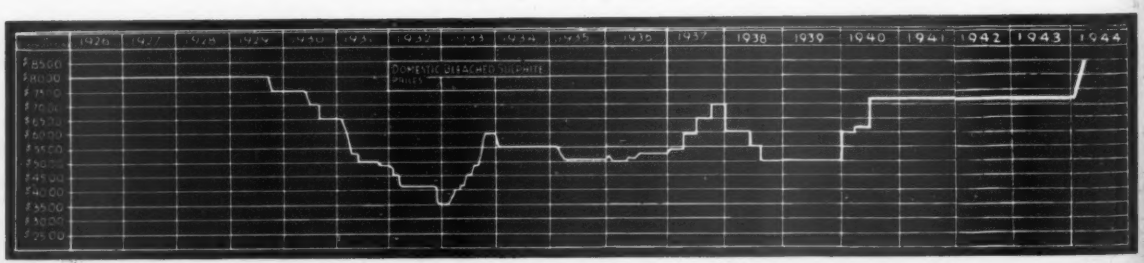
Unlike some other branches of the pulp and paper industry, the kraft branch has been consistently profitable, according to Mr. Williams. He believes that unprofitable overexpansion of the kraft industry and the industry as a whole could be avoided if, after the war emergency, the government would allow producers more freedom in stabilizing prices and productive capacity.

Canadian kraft pulp production also set a new high record of 470,000 tons in 1944, according to estimates.

Rex Vinent's Analysis

Rex Vincent, technical consultant, Bulkley, Dunton Pulp Co., in an interesting study published in the Apr. 1944 issue of PULP & PAPER INDUSTRY, makes these observations and predictions concerning the sulphate pulps:


FOREIGN WOOD PULP PRICE TRENDS
SPOT QUOTATIONS, EX-DOCK, FIRST WEEK OF EACH MONTH
FOREIGN SULPHITE
PRIME BLEACHED
EXTRA STRONG UNBLEACHED
England Abandoned Gold Standard
U.S. Abandoned Gold Standard
Bank Closing
No quotations
FOREIGN KRAFT AND GROUNDWOOD
SWEDISH KRAFT
SCANDINAVIAN GROUNDWOOD
DOLLARS PER TON OF 2000 POUNDS
'11 '12 '13 '14 '15 '16 '17 '18 '19 '20 '21 '22 '23 '24 '25 '26 '27 '28 '29 '30 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42
UNITED STATES PULP PRODUCERS ASSOCIATION



FLUCTUATIONS in U. S. bleached sulphite pulp prices from 1926 to 1944. First increase in prices in 3½ years was allowed by Office of Price Administration in 1944.

SUTHERLAND *Continuous*
BEATING *and* REFINING SYSTEM

FOURTEEN

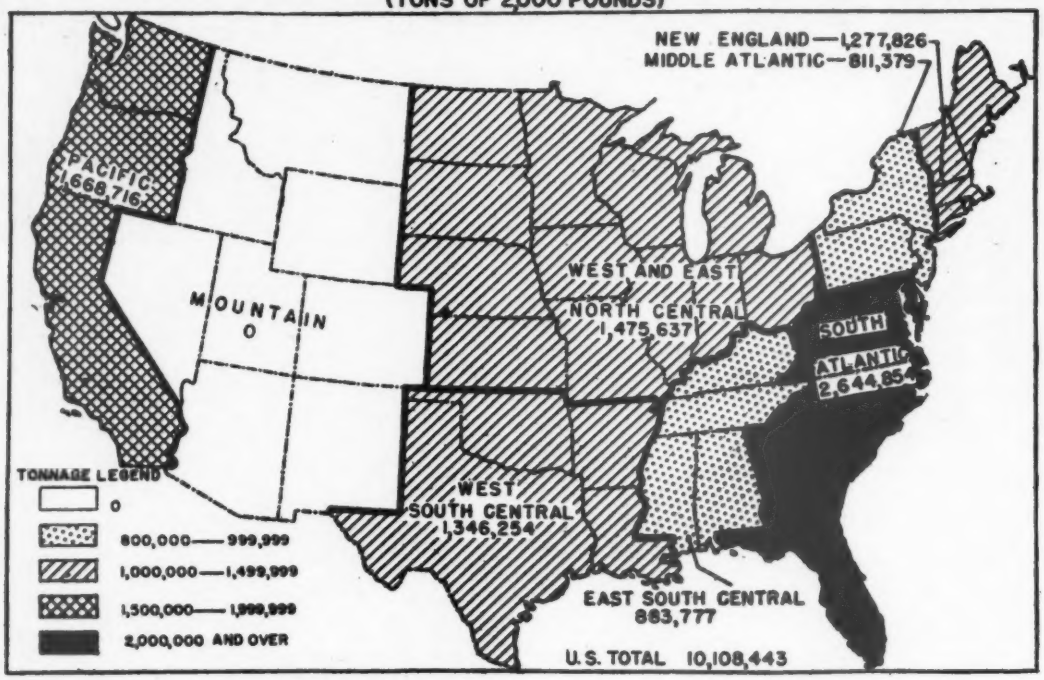
14

Sutherlands alone, since 1939, completely prepare stock for 4 Fourdriniers making over 600 tons daily of Kraft liner, bag, corrugating and wrapping.

SUTHERLAND

S R

WOOD PULP: UNITED STATES PRODUCTION BY GEOGRAPHICAL AREAS DURING 1944
(TONS OF 2,000 POUNDS)



Source: War Production Board

Figures shown in this map were preliminary reports earlier this year. Final revision showed a total of 9,387,456 tons produced.

The decade 1930-1939 brought about several interesting changes in pulp utilization.

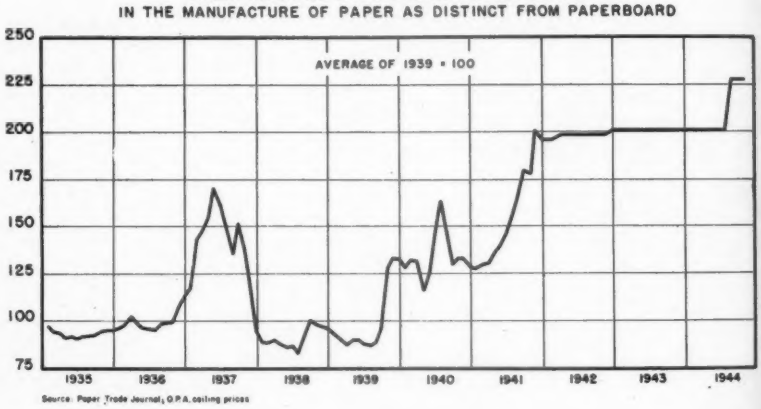
1. Unbleached kraft production in the U. S. increased 202% during those ten years.
2. Bleached kraft production in the U. S. increased 547% during the same period.
3. All pulp production in the U.S. increased only 54%.
4. In 1930, imports of unbleached kraft formed 31% of our total kraft consumption but by 1939 this had dropped to 17.5%.

Thus, during that 10-year period, unbleached kraft consumption increased about four times as much as total pulp consumption, while bleached kraft increased ten times as much. The domestic production increases are reflected in diminishing kraft imports. This trend in kraft, so emphatic before the war, has continued during the war, due largely to the packaging requirements of the services and their need for strong, highly specialized papers. Added to this was the almost complete lack of imports.

The increase in pulp production over the past five years has been largely integrated kraft production and shows that the trend established before the war has continued

WASTE PAPER PRICES

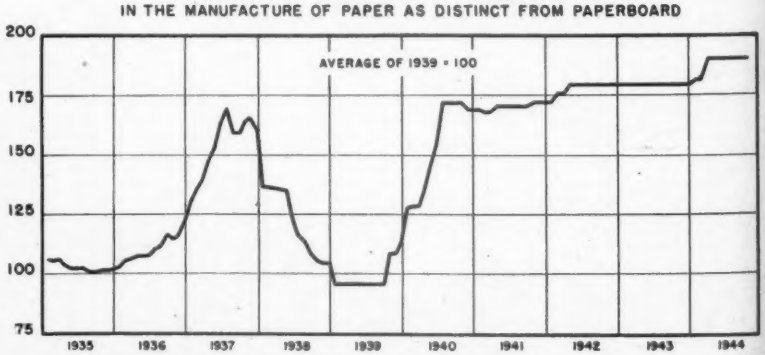
INDEX WEIGHTED ON THE BASIS OF CONSUMPTION
IN THE MANUFACTURE OF PAPER AS DISTINCT FROM PAPERBOARD



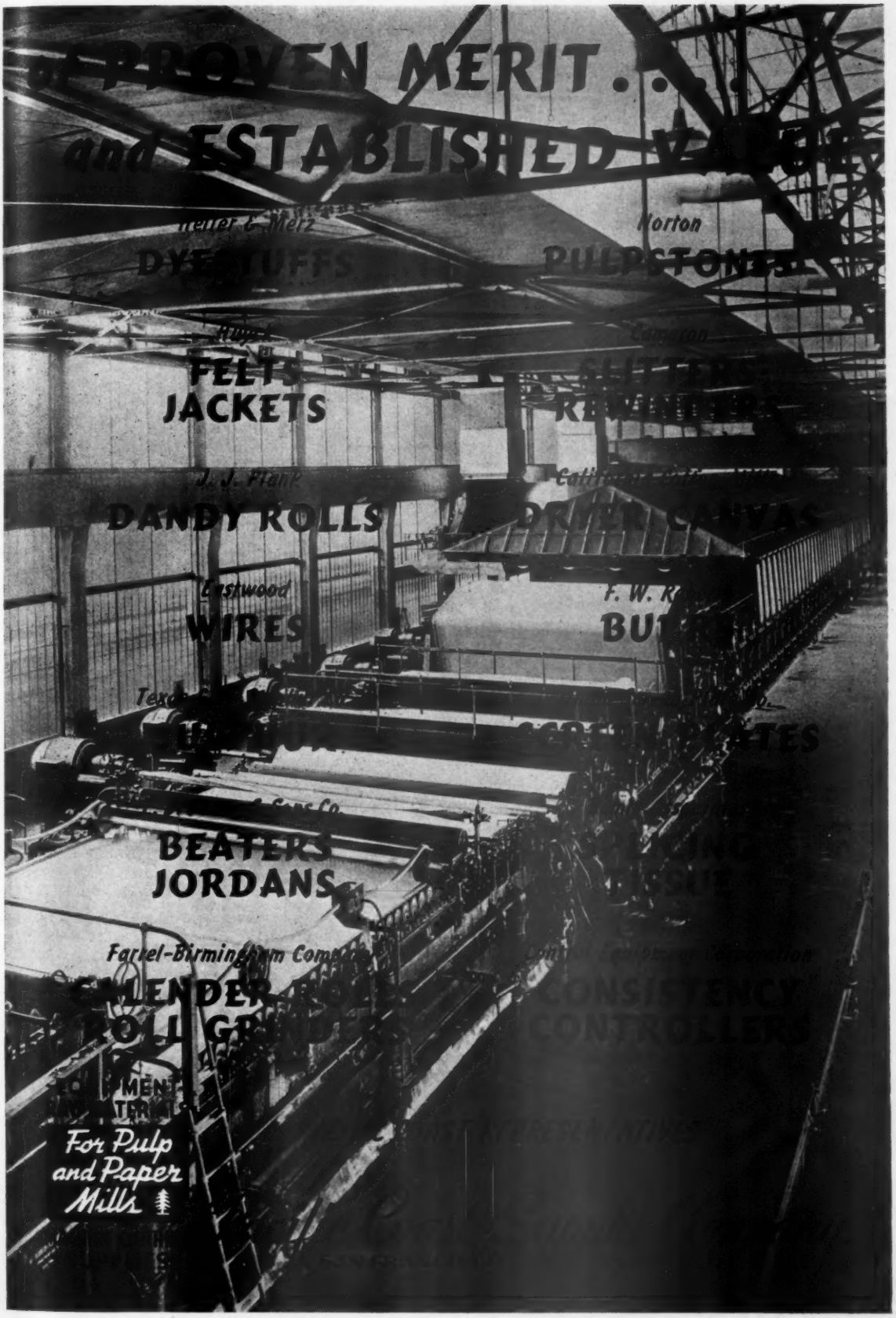
Source: Paper Trade Journal, O.P.A. ceiling prices

WOOD PULP PRICES

INDEX WEIGHTED ON THE BASIS OF CONSUMPTION
IN THE MANUFACTURE OF PAPER AS DISTINCT FROM PAPERBOARD



Source: U.S. Pulp Producers Association; Daily Mill Stock Reporter; O.P.A. ceiling prices


PROVEN MERIT . . .
and ESTABLISHED
Morton
PULPSTONES
FELTS
JACKETS
DANDY ROLLS
Eastwood
WIRES
BEATERS
JORDANS
For Pulp
and Paper
Mills

WOOD PULP: Production in Selected Countries, 1929-39

(Thousands of Short Tons)

Country	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939 a/
Europe:											
Great Britain--	129	113	108	102	111	121	125	129	222	218	180
Sweden---------	2,800	2,680	2,423	2,201	2,824	3,163	3,278	3,506	3,884	3,374	3,457
Norway---------	1,056	1,027	608	992	942	1,083	949	1,094	1,208	992	990
Finland--------	1,072	1,186	1,195	1,392	1,520	1,728	1,904	2,178	2,415	2,444	1,780
Germany--------	2,296	2,249	1,944	1,843	1,912	2,178	2,315	2,540	2,737	2,715	2,800
Russia---------	305	423	451	481	533	579	651	773	924	1,070	950
Austria--------	362	349	344	312	342	351	370	371	456	400	380
France---------	165	183	180	186	252	320	353	375	393	375	400
Czechoslovakia-	357	360	360	239	288	319	310	348	379	350	350
Italy----------	133	139	149	152	138	124	146	153	208	229	200
Poland---------	120	119	107	103	109	135	136	168	191	214	170
Netherlands----	101	101	100	106	108	111	116	117	133	115	120
Estonia--------	75	81	91	84	86	92	93	93	95	100	100
Switzerland----	83	85	74	73	77	85	80	79	99	77	100
Rumania--------	42	47	41	35	38	51	55	60	62	66	65
Lithuania b/---	64	61	43	40	55	64	62	68	76	64	70
Latvia---------	23	27	7	17	24	25	29	36	44	49	40
Yugoslavia-----	---	---	---	---	---	8	9	10	37	30	35
Hungary--------	---	4	4	4	5	6	7	6	7	11	7
Turkey---------	---	---	---	---	---	---	---	1	8	9	9
Denmark--------	---	4	4	4	6	7	7	6	7	7	7
Bulgaria-------	---	---	---	---	---	---	---	2	3	6	4
Total above--	9,183	9,238	8,233	8,416	9,370	10,550	10,995	12,113	13,588	12,915	12,214
Canada---------	4,021	3,619	3,168	2,663	2,980	3,636	3,868	4,485	5,141	3,668	4,166
Newfoundland---	231	288	281	263	266	306	331	322	353	267	350
United States--	4,862	4,630	4,409	3,760	4,276	4,436	4,926	5,695	6,573	5,934	6,993
TOTAL----------	18,298	17,775	16,091	15,102	16,892	18,928	20,120	22,615	25,655	22,784	23,723

a/ Estimated except for Canada, United States, Finland and Sweden.
b/ Estimated
Source: 1929-1938 United States Pulp Producer's Association, Wood Pulp Statistics, July 1944.

through the war years. In other words, we see that more and more kraft papers are being made in integrated mills and must conclude that as time goes on there will be less and less domestic kraft pulp for sale. These mills who must buy kraft pulp will be looking to imports for their major source of supply.

A further check on these trends in kraft pulp can be obtained by examining data from the Department of Commerce and the WPB on the components of various grades of paper and paperboard. In 1939 bleached kraft formed no part of book papers, and only 1.4% of fine papers; by 1944 these figures had changed to 12.6% of book paper and 9.5% of fine paper.

Therefore, on sulphate pulps these conclusions can be drawn:

1. The expanding production indicated will continue for some time and most of the new pulp production will be in sulphate.
2. There will be a greatly expanded use of bleached kraft pulp.
3. Most of the kraft pulp, bleached and unbleached, purchased by consumers, will be imported.
4. The large volume kraft papers, such as bag, wrapping, etc., will be produced in integrated mills.

PRODUCTION OF WOOD PULP BY TYPE, BY REGION AND BY STATE, 1944 AND 1943 1/
(Tons of 2,000 pounds)

Type of wood pulp, region and state	1944	1943
All types of wood pulp, United States total ..	10,108,443	2/9,680,462
New England States, total	1,277,826	1,343,083
Maine	1,043,209	1,103,770
New Hampshire	179,129	191,551
Vermont	20,508	15,694
Massachusetts and Rhode Island	34,980	32,068
Middle Atlantic States, total	811,379	791,997
New York	497,252	509,762
New Jersey	46,158	31,701
Pennsylvania	267,969	250,534
East and West North Central States, total .	1,475,637	1,433,540
Ohio and Illinois	72,396	63,449
Michigan	206,754	195,048
Wisconsin	857,986	835,076
Minnesota	338,501	339,967
South Atlantic States, total	2,644,854	2,482,706
Maryland and Virginia	657,312	610,085
North Carolina and South Carolina	917,112	858,526
Georgia	415,282	388,405
Florida	655,148	625,690
East South Central States, total	883,777	831,727
Tennessee and Alabama	430,663	393,776
Mississippi	453,114	437,951
West South Central States, total	1,346,254	1,237,689
Louisiana	929,313	866,953
Arkansas and Texas	416,941	370,736
Pacific States, total	1,668,716	1,559,720
Washington	1,256,374	1,153,177
Oregon and California	412,342	406,543

Source: War Production Board

(The 1944 total figure for pulp production is a preliminary report and later revised to 9,387,456 tons. Therefore the 1944 figures for states in many cases may be slightly above revised calculations).

BROKEN

That's the way we'd like to market our CALCOT cotton dryer felts that have processed to eliminate all stretch. They are "broken in" on equipment designed and constructed for that purpose. This opens and sets the weave so that these dryers will not stretch or narrow up on your machines.

These felts retain their qualities of long life, low cost and high porosity that have made CALCOT dryers favorites among Pacific Coast paper makers for many years.

On your next order specify

"processed CALCOT dryers."

CALIFORNIA COTTON MILLS COMPANY

Oakland, California

Sales Agents

PACIFIC COAST SUPPLY CO.

San Francisco

EXPORTS and IMPORTS--Trade Agreements, Other Postwar Policies, May Alter Trends

Both imports and exports of wood pulp by the United States are currently at the lowest ebb in over 20 years.

They reached the lowest level since the early 1920's during 1944 and during the first half of 1945 imports continued downward, but exports were rising.

Both U. S. exports and imports through 1944 and the first half of 1945 were less than half what they were in peak years. The peak year for exports was in 1940 and for imports, 1937, when the biggest shipments of Scandinavian pulp were coming into this country.

But during the latter part of 1945 and into 1946, a sharp upward increase was expected in imports and exports may also continue a slight upward curve. As for imports, War Shipping Administrator Emory S. Land said that almost immediately after V-E Day, enough Allied shipping would be available to move considerable amounts of wood pulp from Sweden to the U. S."

A total of 61,000 tons were allocated by the War Production Board for export in the second quarter of 1945 as compared with only 49,000 in the average 1944 quarter (This figure is slightly above U. S. Pulp Producers Assn. estimates published on these pages). Although the exports were only a fraction of the domestic production rate of more than two and one-half million tons per quarter and only about one-fourth the rate of imports, which presumably were coming entirely from Canada, U. S. paper mills were in such dire straits that they protested strongly through their association against any increase in exports. Even this small margin conceivably could force shutdowns in paper mills. By the time V-E Day had passed, strong industry representations apparently had convinced the State Department and the government that Sweden and Russia ought to supply the pulp needed in liberated European countries.

They still had to reckon, however, on the Good Neighbor policy as far as exports to Latin American countries were concerned. The State Department was firmly committed to a program of considering any and all exports and imports as "weapons" of foreign policy while war was still being waged in the Pacific and the peace still unwritten.

The table on "U. S. Pulp Supply and Use" is the only data from the government on exports and imports. The U. S. Department of Commerce adhered to its policy of refusing to issue export or import figures relating to any individual commodity, a policy it has continued since late 1941 as a war measure.

However, the U. S. Pulp Produc-

U. S. WOOD PULP EXPORTS

Quantity and Value

	Short Tons	Value
1944	*184,000	
1943	*263,000	
1942	*380,000	
1941	*322,000	
1941 (9 mos.)	246,986	$15,801,270
1940	480,362	29,649,300
1939	139,504	6,493,140
1938	140,484	9,986,826
1937	302,050	19,891,483
1936	193,485	10,600,176
1935	171,710	8,632,971
1934	142,931	7,005,559
1933	79,191	3,113,883
1932	47,860	2,037,553
1931	53,307	2,405,642
1930	48,426	2,070,553

*Estimated by U. S. Pulp Producers Assn.
Source for all other figures: U. S. Dept. of Commerce.

U. S. Exports by Grades

	1943	1944
Bleached Sulphite	60,000	29,000
Unbleached Sulphite	72,000	36,000
Bleached Sulphate	8,000	6,000
Unbleached Sulphate	117,000	105,000
Soda	5,000	8,000

Estimates by U. S. Pulp Producers Assn.

UNITED STATES WOOD PULP IMPORTS

Quantity and Value

1922 - 1944

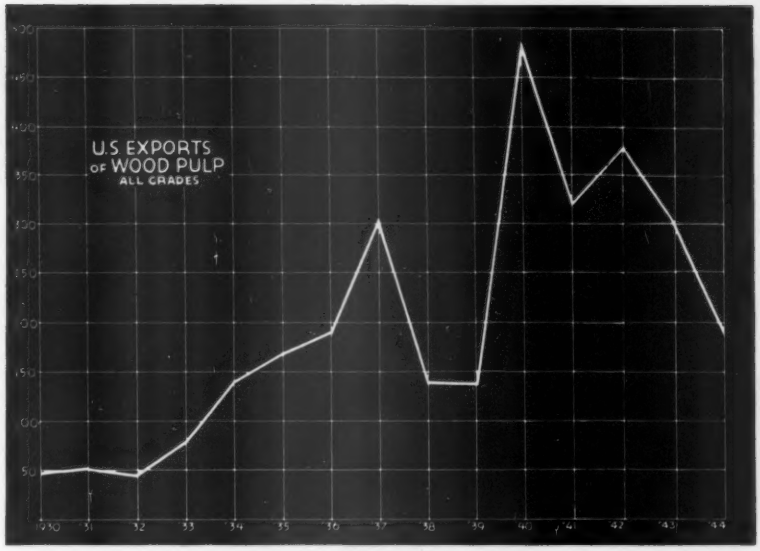
	Chemical Pulp		Mechanical Pulp		Total Pulp	
	Short Tons	Value	Short Tons	Value	Short Tons	Value
1944	*878,000		*182,000		*1,060,000	
1943	*1,034,000		*213,370		*1,252,292	
1942	*988,000		*212,000		*1,200,000	
1941 (12 months)	*941,000		*204,000		*1,145,000	
1941 (9 months)	674,328	$42,831,566	136,759	$3,724,960	811,078	$46,556,526
1940	1,053,660	55,481,017	170,909	4,712,649	1,224,569	60,193,666
1939	1,798,459	70,659,074	227,954	5,218,752	2,026,413	75,877,826
1938	1,551,917	69,181,811	170,470	3,592,369	1,722,387	72,774,180
1937	2,176,343	93,955,854	218,422	4,342,168	2,394,765	98,298,022
1936	2,050,051	78,839,776	227,778	4,051,224	2,277,829	82,891,000
1935	1,743,602	67,483,566	190,041	3,277,385	1,933,643	70,760,951
1934	1,616,754	58,605,219	189,374	3,245,050	1,806,128	61,850,269
1933	1,731,513	54,184,001	210,280	3,214,919	1,941,793	57,398,920
1932	1,293,495	43,652,916	188,464	3,268,457	1,481,959	46,921,373
1931	1,386,112	56,409,638	210,656	4,498,022	1,596,768	60,907,660
1930	1,533,646	74,140,504	299,256	7,146,290	1,832,902	81,286,794
1929	1,614,043	82,840,220	273,461	6,245,776	1,887,504	89,085,996
1928	1,513,125	78,476,280	249,198	5,443,496	1,762,323	83,919,776
1927	1,433,919	80,124,449	245,599	5,961,821	1,679,518	86,086,270
1926	1,431,973	83,208,851	303,758	8,278,220	1,735,731	91,487,071
1925	1,334,900	73,469,063	331,092	8,517,116	1,665,992	81,986,179
1924	1,279,177	68,678,210	245,919	7,190,129	1,525,096	75,868,339
1923	1,084,013	65,495,800	299,630	9,280,863	1,383,643	74,776,663
1922	1,043,832	57,600,844	215,810	5,706,529	1,259,642	63,307,373

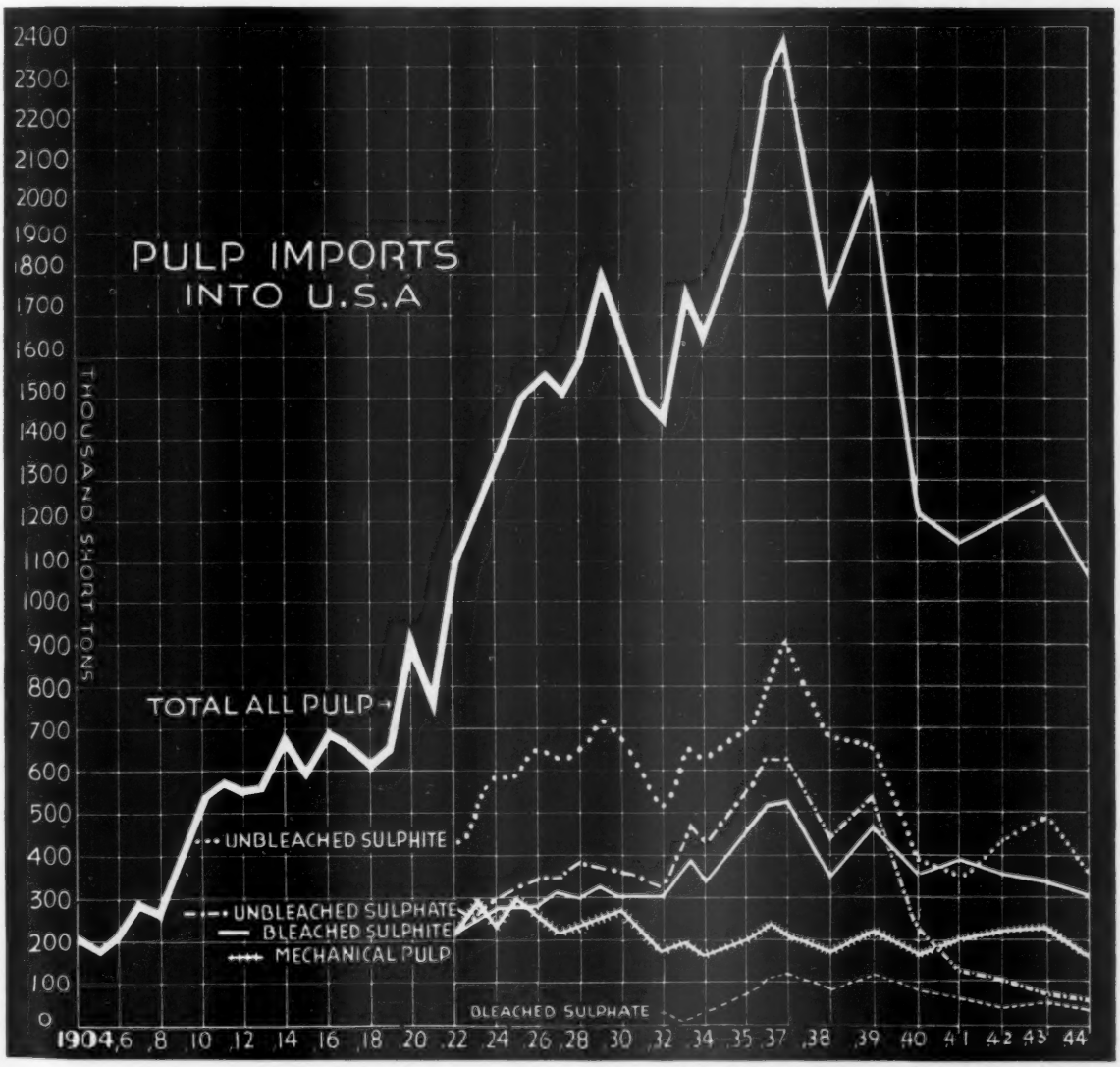
*Estimated by U. S. Pulp Producers Assn. Data through September, 1941, from Department of Commerce.

ers Association estimates U. S. 1944 exports at 184,000 tons (The WPB quarterly average figure indicates a figure of 196,000 tons). There is no doubt exports would have been much higher if the situation were not so tight.

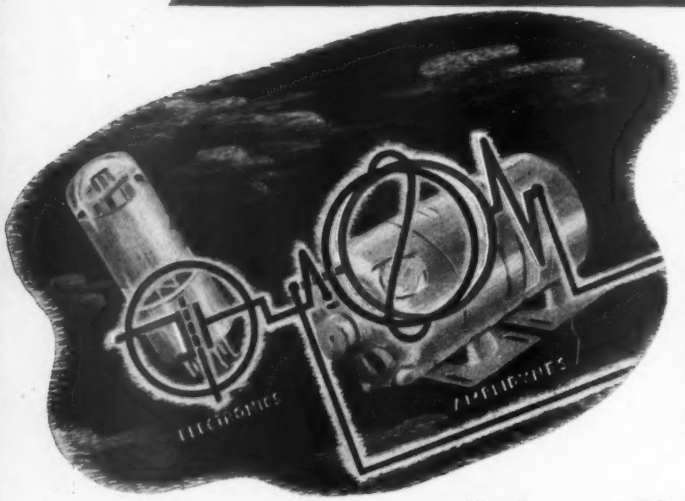
Exports still are very closely controlled by the Government under wartime regulations, every bit of the pulp exported being carefully allocated to those foreign countries for which exportations are intended.

Pulp exports during 1944 were further sharply reduced from the tonnages the government allowed to be exported during the first two years the United States was engaged in the present war. While official data are also lacking for 1943 and 1942, the Association's estimates for those years are 263,000 tons for 1943, and 380,000 tons for 1942. Thus, last year's shipments out of



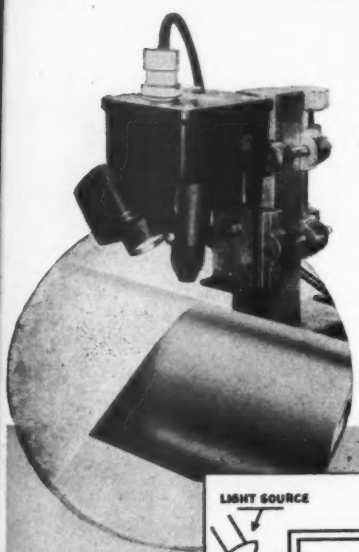


Now HAIRLINE Control



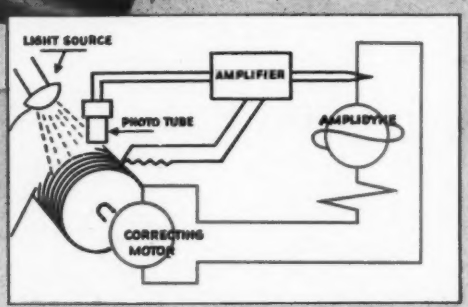
This G-E PARTNERSHIP MAKES IT PRACTICAL

The combination of electronic tubes and the G-E amplidyne (and often electronics alone) opens up many new possibilities in the precise control of paper travel over a wide range of speeds.



Already, successful installations are controlling side register and cut-off, regulating speed of supercalenders, and maintaining constant tension on rewinders as well as on sectional and single-motor paper machines. On bag machines, cut-off control at speeds of 400 to 500 ft per min is being held to an accuracy of 1/32 inch or better. Color register on high-speed presses is being held to 3/1000 inch at 1000-ft-per-min speeds!

With the G-E amplidyne, response to the control impulse is fast and positive. This generator-like unit steps up small control signals to working forces that can handle heavy machinery without appreciable time lag. By eliminating many contactors and relays, the amplidyne gives you a new concept of operating simplicity.



MAINTAINING SIDE REGISTER: Where accurate positioning is required, G-E photoelectric control equipment (left) scans the moving paper and detects variations in register by differences in reflected light. Electronically amplified, this control impulse acts through a G-E amplidyne to provide the corrective motive power. This is only one of the many ways in which these versatile units hold operations to the desired position, torque, or tension—regardless of speed.

GENERAL ELECTRIC

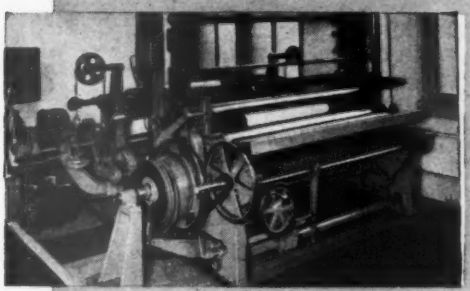
660-15-127

MADISON SUB-BRANCH
U. S. D. AGRICULTURE LIBRARY
FOREST PRODUCTS LABORATORY 87
MADISON 5, WISCONSIN

# of Paper Travel

FOR WINDERS, SLITTERS

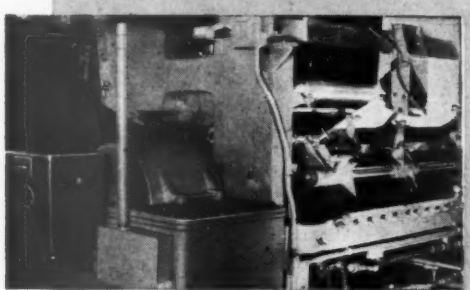
Accurate side register control as paper travels at high speed is initiated by a photoelectric scanning head at the edge of the sheet (shown just below counterweight). An amplidyne powers the motor which corrects the roll position.



G-E side-register control on Cameron Machine Co. paper winder and slitter

FOR COLOR REGISTER

Here's extreme accuracy of register at high speed—a multicolor rotogravure press with paper speed of 1000 ft per min! A register mark made by the first impression is photoelectrically matched with a register slit on the next printing cylinder.



Installation at Neo Gravure Co., New York City.

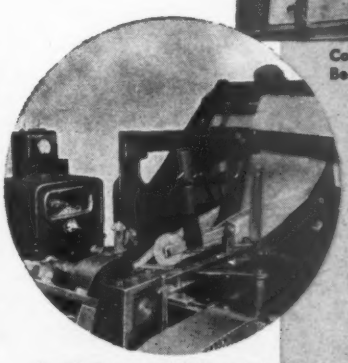
FOR BAG-MAKING MACHINES

Web-register control for precise cut-off begins with photoelectric scanning of register marks. An amplidyne-powered motor applies a differential correction between draw-roll speed and knife-roll speed.

Complete G-E bag-machine control a Bemis Bag Co., Peoria, Ill.

OR WHAT-HAVE-YOU?

Whenever paper in motion creates a control problem for you, you'll find G.E. ready with a practical solution, derived from wide experience on all kinds of paper-mill and printing-plant drives, as well as from electronic research. Let our application engineers give you the facts on the operating and maintenance experience of electronic controls now in regular use. You'll find convincing evidence of high operating continuity under difficult service conditions. *General Electric Co., Schenectady 5, N. Y.*



Installations at Arkell and Smiths, Canajoharie, N. Y.

Buy all the BONDS you can—*and keep all you buy!*

PROPORTION OF UNITED STATES MARKET FOR PULP SUPPLIED BY AMERICAN PULP MILLS AND FOREIGN PULP MILLS—1939-1941-1943-1944

Tons—2,000 Lbs.

TOTALS By Grades.	Pulp Produced By U. S. Mills for Sale in Domestic Market — 1939	Pulp Imported Into United States — 1939	Pulp Produced By U. S. Mills for Sale in Domestic Market — 1941	Pulp Imported Into United States — 1941	Pulp Produced By U. S. Mills for Sale in Domestic Market — 1943	Pulp Imported Into United States — 1943	Pulp Produced By U. S. Mills for Sale in Domestic Market — 1944	Pulp Imported Into United States — 1944
	1939		1941		1943		1944	
Total—All Grades	1,049,753	2,035,249	1,723,584	1,145,000	1,313,067	1,252,292	1,500,000	1,072,000
Total—Sulphite	685,774	1,135,302	1,228,530	740,000	904,651	842,005	946,635	712,000
Bleached Sulphite	464,296	474,109	767,970	390,000	710,340	361,708	752,713	321,000
Rayon, Special Chemical	106,760	88,052	196,564	122,000	.....	.....	420,921	135,000
Other	319,687	386,057	571,406	267,000	.....	.....	331,792	186,000
Unbleached Sulphite	219,012	661,193	460,560	351,000	194,311	480,297	193,922	391,000
Total—Sulphate	143,614	654,419	319,341	176,000	264,415	153,139	378,223	146,000
Bleached Sulphate	77,786	108,252	72,968	60,000	53,296	62,000	99,637	59,000
Unbleached Sulphate	65,793	546,167	246,373	116,000	211,119	91,139	278,586	87,000
Total Groundwood	30,194	227,432	57,862	204,000	48,859	213,370	50,015	168,000
Total Soda	86,591	8,952	111,200	17,000	87,944	19,892	96,843	16,000
Total Semi-Chemical	.....	.....	6,512	.....	35	.....	701	0
Total—Miscellaneous, Damaged and Off-Quality	16,189	192	.....	.....	7,163	23,886	27,958	30,000

"Pulp Produced By U. S. Mills for Sale in Domestic Market" includes that part of the stocks on hand at the end of the year intended for future shipment to domestic buyers.

Source: United States Pulp Producers Association. Figures exclusive of defibrated and exploded wood pulp and asplund fiber.

this country showed declines of 79,000 tons or 30.3% from the year preceding, and 196,000 tons or 51.6% from 1942.

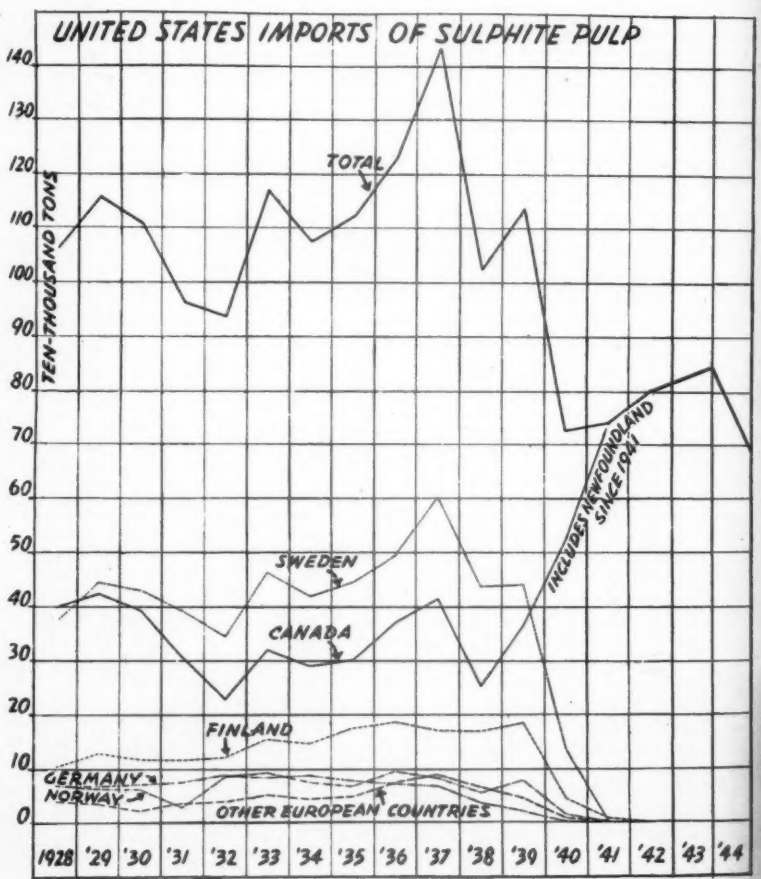
Contrasted with the record amount of wood pulp ever exported from the United States in a single year, or 480,362 short tons in 1940, last year's shipments to foreign markets represented a decline of 296,362 tons, or 61.6%.

According to the USPPA, exports of sulphite—bleached and unbleached—were reduced approximately by one-half last year, or from 132,000 tons in 1943 to 65,000 tons in 1944, while exports of sulphate—bleached and unbleached—were lowered from 125,000 tons in 1943 to 111,000 tons in 1944. Soda pulp exports increased from 5,000 tons in 1943 to 8,000 tons last year.

Pulp Imports

An official figure—for the first time since the war began—for U. S. pulp imports can be deduced from the War Production Board's "U. S. Supply and Use" table. It will be seen that this lists average quarterly import in 1944 of 262,000 tons; therefore, the 1944 total would be 1,048,000 tons.

This is very close to United States Pulp Producers Association estimates. The latter estimated total 1944 imports at 1,060,000 tons air dry weight, a decrease of 192,000 tons or 15.3% from 1943.



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- Screen Rooms and Deckers
- Semi-chemical Fibre Washers and Bleachers

. . . AND MORE

Let us work with you

IMPCO

Improved **PAPER MACHINERY CORPORATION**

NASHUA, NEW HAMPSHIRE

UNITED STATES WOOD PULP IMPORTS — 1929-1944

(In tons of 2000 pounds)

	SULPHITE			SULPHATE						
	Bleached		Un-		Un-		TOTAL		TOTAL	
	Rayon*	Other	bleached	Bleached	bleached	SODA	Chemical	Mechanical	Screenings	TOTAL
1929	.....	374,343	.....	785,631	17,208	430,085	0	1,607,267	273,461	.....	1,880,728
1930	.....	361,632	.....	744,855	21,877	400,457	2,164	1,530,985	299,232	.....	1,830,217
1931	.....	358,418	.....	604,807	33,245	385,965	3,422	1,385,857	210,564	.....	1,596,421
1932	.....	348,372	.....	569,058	26,170	347,938	1,757	1,293,295	188,465	.....	1,481,760
1933	.....	448,780	.....	720,162	41,014	517,418	3,996	1,731,370	210,206	.....	1,941,576
1934	.....	398,141	.....	675,491	54,066	481,435	7,465	1,616,598	189,374	.....	1,805,972
1935	.....	429,424	.....	693,026	84,658	526,684	9,416	1,743,208	190,041	.....	1,933,249
1936	.....	512,168	.....	786,720	102,375	635,722	12,737	2,049,722	227,778	.....	2,277,500
1937	91,805	.....	420,156	919,680	111,825	622,390	10,327	2,176,183	218,422	.....	2,394,605
1938	65,219	.....	272,440	686,252	90,173	427,765	9,405	1,551,254	159,139	.....	1,710,393
1939	88,052	.....	386,057	661,193	108,252	546,167	8,952	1,798,673	227,768	.....	2,026,441
1940	113,945	.....	238,972	373,390	84,887	223,577	10,763	1,053,057	171,513	8,127	1,224,570
1941	121,130	.....	270,394	361,397	59,394	116,224	15,864	933,458	204,428	15,492	1,157,886
1942	135,000	.....	240,000	451,000	58,000	91,000	18,000	1,001,000	226,000	14,000	1,227,000
1943	133,000	.....	220,000	480,000	60,000	91,000	20,000	1,034,000	222,000	45,000	1,256,000
1944	139,000	.....	178,000	368,000	48,000	87,000	17,000	869,000	175,000	30,000	1,044,000

*Pulp classified by Bureau of Foreign and Domestic Commerce as "Rayon and Special Chemical Grades."
Source: United States Bureau of Foreign and Domestic Commerce. 1944 data from U. S. Pulp Producers Association.

Obviously, the estimate of last year's imports is predicated on receipts of pulp from Canada and Newfoundland, because although official data are lacking, not a single ton of pulp came into the United States during the past year or the two years before from any European country. Some limited tonnage probably from Newfoundland.

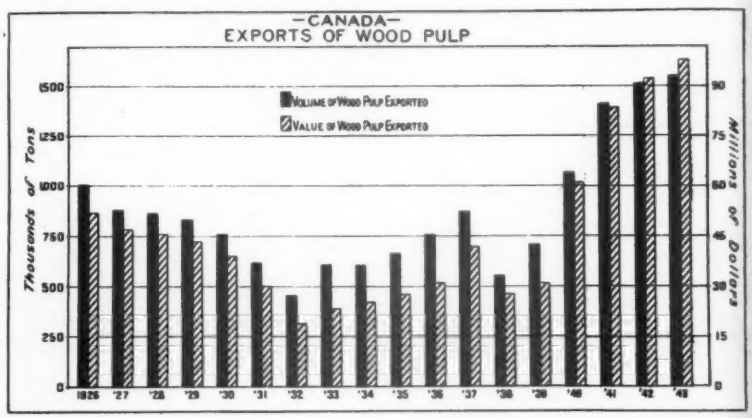
The fact that total imports last year fell below those of the year before may be ascribed to raw material and manpower shortages in Canada.

The significant comparison of 1944 pulp imports is not with the year before, nor with the other wartime years of 1942 and 1941, but rather with importations five years ago or in 1939, prior to the cutting off by the war of the European source of pulp supply. During 1939, total pulp imports into the United States, including both chemical and mechanical grades, amounted to 2,026,413 short air dry tons. Thus, last years' receipts of 1,060,000 tons constituted a tremendous decline of 966,413 tons, or 47.6% from the pre-war level. In other words, only slightly better than one-half of the pre-war tonnage of pulp was received by the American consuming market from foreign sources during 1944.

Far Below Record Year

Contrasted with the record pulp importations into the United States in any year, or 2,394,765 short tons of all grades in 1937, last year's receipts of pulp from outside of the country represented a drop of 1,334,765 tons, or 55.7%. In short, the 1944 imports were less than half of the tonnage received during the year of maximum pulp importations.

Imports of chemical pulp last year totaled 878,000 short air dry tons contrasted with 1,034,000 short tons in 1943, a decline of 156,000 tons, or 15.1%. Compared with the record chemical pulp imports in any year or 2,176,343 short tons in 1937, the 1944 receipts showed a loss of 1,298,343 tons, or 59.2%.

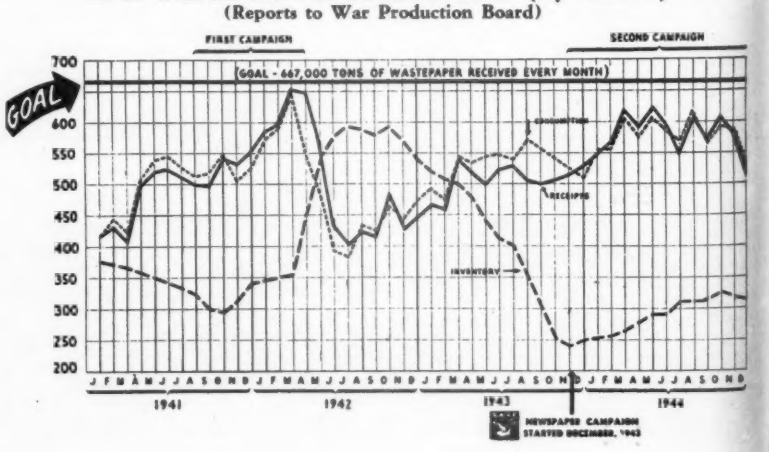


Mechanical wood pulp imports last year are estimated at 182,000 short air dry tons, compared with 218,000 tons in 1943, a decrease of 36,000 tons, or 16.5%.

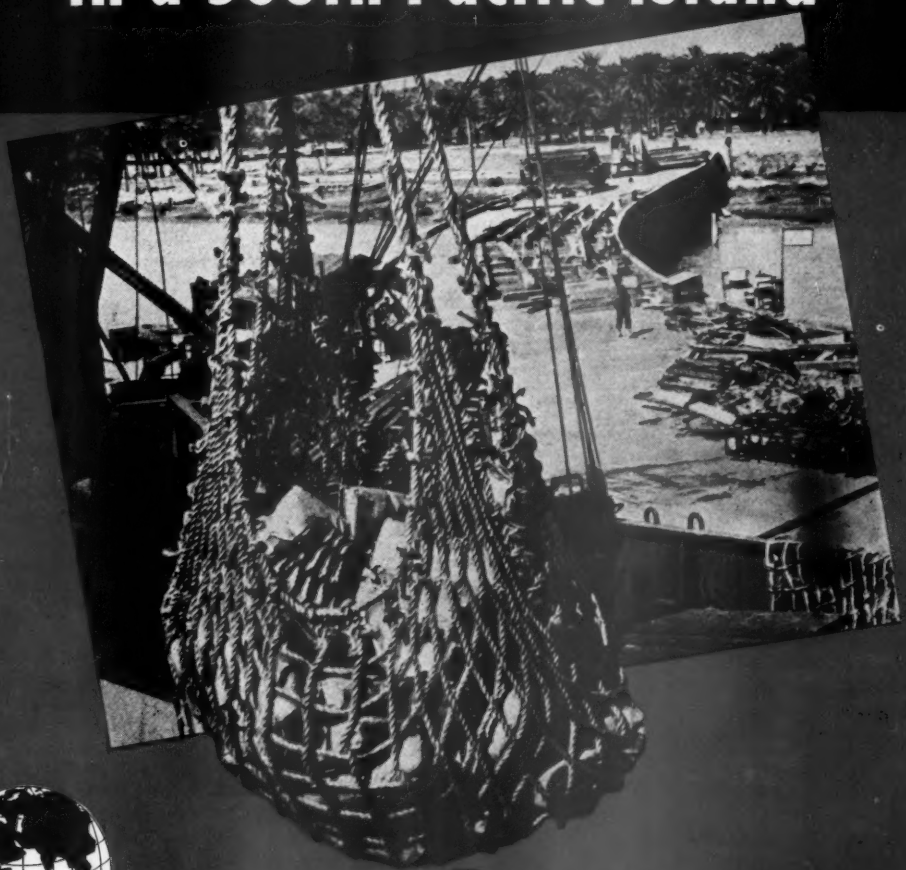
The Association estimates imports of bleached sulphite in 1944 at 325,000 short tons, against 362,000 tons in 1943; of unbleached sulphite, 391,000 tons, against 480,000 tons; of bleached sulphate, 62,000 tons, against the same tonnage in 1943; of unbleached sulphate, 83,000 tons, against 91,000 tons, and of soda pulp, 17,000 tons, against 20,000 tons. ***(More about pulp on page 118).***

U. S. WASTE PAPER COLLECTIONS (By Months)

(Reports to War Production Board)



Supplies *Swing Ashore* in a South Pacific Island



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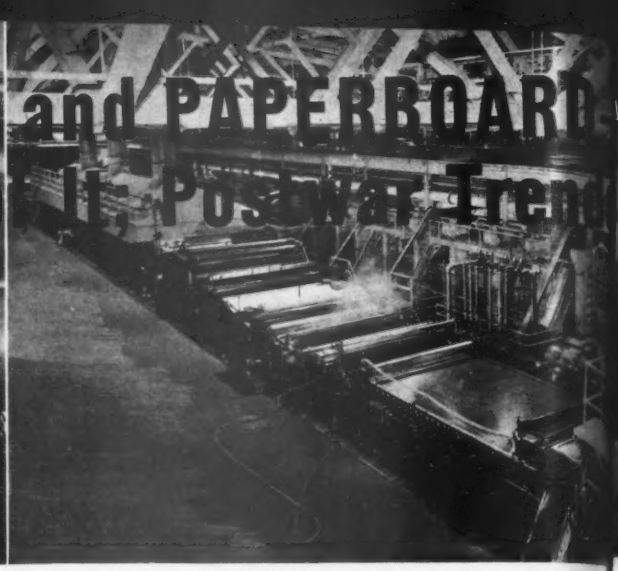
MULTIWALL PAPER BAGS



PAPER and PAPERBOARD
More of It, Postwar Trend

THE North American paper and paperboard industry may look forward to an interesting and profitable era of expansion in the immediate postwar years, limited only by the extent to which it can recover manpower losses, obtain modern equipment and an adequate supply of pulp and other manufacturing materials.

These possible limitations are not to be lightly considered, by any means. Some of them have been discussed in preceding articles. The cold, hard facts of the case were that in some ways the paper and paperboard industry was in an even more dangerous position in the middle of 1945 than in the critical days of 1942 when the military and civilian public had virtually no conception of the importance of paper and board and government was toying with ideas of concentration of manufacturing and other drastic actions to streamline the industry.

The manpower situation by mid-1945 was more acute than it ever has been, with no prospect of relief for some time, despite the favorable turn of the war. The unfavorable cost-price relationship for the industry threatened to seriously hamper production which was simply unable to meet the 1945 needs of the military and government. The pulpwood supply was most acute, especially in the South and in that region it was affecting production. Industry leaders were seeking to convince OPA, Manpower Commission and other officials that serious set-backs, with long-lasting consequences, lurked in these threats to essential war production.

Early arrival of Swedish pulp as a result of the end of war in Europe was expected, however, to bring enough relief so that pulp allocations could be discontinued in the fourth quarter of 1945.

By utilizing its largely overworked and dated equipment to the utmost—getting every ounce of production possible out of what they

U. S. TOTAL PAPER SUPPLY

The following table issued by the Forest Products Bureau of the War Production Board, gives comparisons of paper and board supply in the U. S. in 1945 with previous years, according to the WPB program:

(in Thousands of Tons)

	Average Quarter 1940	1941	1944	2nd Qtr. 1945
Total Paper	4,325	5,210	4,940	5,020
Domestic Production:				
Paper	2,009	2,340	2,055	1,951
Paperboard	1,612	2,100	2,241	2,420
Imports (chiefly newsprint)	770	700	644	649

TOTAL PAPER PRODUCTION IN UNITED STATES

(Tons of 2,000 lbs.)

	1939	1940	1941	1942	1943	1944
Newsprint	954,259	1,056,304	1,043,999	967,211	811,309	720,752
Book	1,534,591	1,655,423	2,025,851	1,704,029	1,592,878	1,435,785
Groundwood	540,342	550,453	642,676	610,168	585,673	593,094
Fine	723,302	735,753	950,014	1,055,475	1,020,601	974,372
Wrapping (Coarse)	2,238,993	2,500,818	2,778,441	2,713,738	2,501,637	2,559,447
Tissue	648,429	733,894	175,336	170,653	162,766	157,540
Sanitary	.....	.....	737,538	811,343	806,023	807,893
Absorbent	121,717	129,410	61,941	64,530	88,254	90,107
Building Papers	659,090	682,460	917,912	1,001,383	877,582	881,246
Other Paper	63,625	60,120	28,657	16,148	129	.....
Container Board	3,361,441	3,434,834	4,183,846	3,755,438	4,087,972	4,228,304
Folding Boxboard	1,359,961	1,416,452	1,841,916	1,711,795	2,015,640	2,116,152
Setup Boxboard	865,485	898,549	1,238,850	996,688	829,102	750,313
Tube Stock	.....	.....	.....	164,785	307,308	458,107
Building Boards	114,505	179,443	761,480	1,052,054	1,063,851	1,087,467
Other Boards	324,102	449,796	373,868	288,424	284,963	322,225
TOTAL	13,509,642	14,483,709	17,762,365	17,083,862	17,035,688	17,182,804

Source: 1939-1944: Bureau of Census, U. S. Department of Commerce.

could work with—the industry north of the Rio Grande produced a grand total of approximately 21,347,000 tons of paper and paperboard during 1944—greatly exceeding production of all the rest of the world.

This figure is the second highest in the history of the North American industry—an amazing accomplishment in view of the circumstances. It is an accomplishment that could very well be pointed to as the answer of all answers to the question—what did the North American paper industry contribute to the war effort?

Here's comparisons of recent years:

Total Paper Production of U. S. and Canada

Year	Tons
1944	21,347,084
1943	21,002,032
1942	21,315,629
1941	22,287,141
1940	18,803,123
1939	17,110,144

How It Was Done

The U. S. paper mills were able to operate in 1944 at only 88.4% capacity as compared with 97.4% in 1941. Despite increasing difficulties, they gradually worked up to 90.2% of capacity through March of this year.

The U. S. paperboard mills operated at 93% of capacity in 1944 and 1943 as compared with 92% in 1941 and 84% in 1942. In the month of March, 1945, they were operating at 97%.

Just how production has been pushed upward against discouraging odds in an effort to meet military and government demands, is reveal-

UNITED STATES PAPER PRODUCTION, IMPORTS, EXPORTS, AND CONSUMPTION

(Quantities in Tons of 2,000 Pounds)

TOTAL — ALL GRADES

Year	Production	Imports	Exports	Consumption — Tons	Consumption — Lbs. Capita
1899	2,167,593	.....	.....	2,167,593	57.9
1904	3,106,696	.....	77,704	3,028,992	73.3
1909	4,121,495	55,962	74,764	4,102,693	90.5
1914	5,152,705	349,278	106,713	5,395,270	110.2
1919	5,966,076	707,548	420,540	6,253,084	119.1
1924	7,929,985	1,500,433	149,541	9,280,877	164.0
1925	9,001,742	1,567,121	152,351	10,416,512	181.4
1926	9,794,086	1,973,451	183,130	11,584,407	198.8
1927	10,002,070	2,107,344	184,226	11,925,188	201.8
1928	10,403,338	2,266,828	218,730	12,451,436	207.8
1929	11,140,235	2,533,603	262,383	13,411,455	220.7
1930	10,169,140	2,365,272	215,811	12,318,601	200.7
1931	9,381,840	2,136,079	170,891	11,347,028	182.8
1932	7,997,872	1,848,016	119,292	9,726,596	155.6
1933	9,190,017	1,852,420	126,854	10,915,583	173.6
1934	9,186,598	2,265,281	163,199	11,288,680	178.3
1935	10,479,095	2,456,998	178,370	12,757,723	200.1
1936	11,975,552	2,855,153	179,727	14,650,978	228.1
1937	12,837,003	3,435,222	232,361	16,039,864	248.2
1938	11,380,814	2,357,477	208,064	13,530,227	207.8
1939	13,509,642	2,702,952	266,070	15,946,515	243.4
1940	14,483,709	2,826,880	578,248	16,732,341	254.2
1941	17,762,365	3,120,213	494,911	20,387,667	308.9
1942	17,083,862	3,046,207	390,837	19,739,132	296.8
1943	17,083,680	2,762,429	347,864	19,450,253	286.8
1944	17,182,804	2,616,000	344,000	19,454,804	286.1

Source: American Paper & Pulp Assn.

ed by these APPA statistics:

Ten per cent fewer employes 100,000 tons more paper than in 1942.

Production per employe increased from 98 tons in 1939 to 117 tons in 1944.

Average weekly hours of labor increased from 39.2 to 49.4.

This greatly increased efficiency under very difficult conditions, in an industry essential to war, reflects the consciousness of the importance of the industry in the minds of both management and employes.

Essentiality

Some publicist for the industry (and there weren't many of them being heard in those days) struck upon a very graphic and effective means of illustrating the importance of the industry early in the war, with the phrase: "Without paper, the war could last only 60 days."

Just how essential was paper and board? The U. S. Department of Commerce figured out that 38.1% of it was for direct war purposes in 1944 and another 33.5% for communication, transportation, health, public utility and other similar essential activities. Both of these figures are undoubtedly substantially higher in 1945 on the basis of increased military and government demands. Paperboard was rated even higher in 1944, with 49% for direct war uses and 28% for other essentials.

The paper and board industry has been thinking more and more of the opportunities and demands of the postwar era. If it was true that the war could not have been

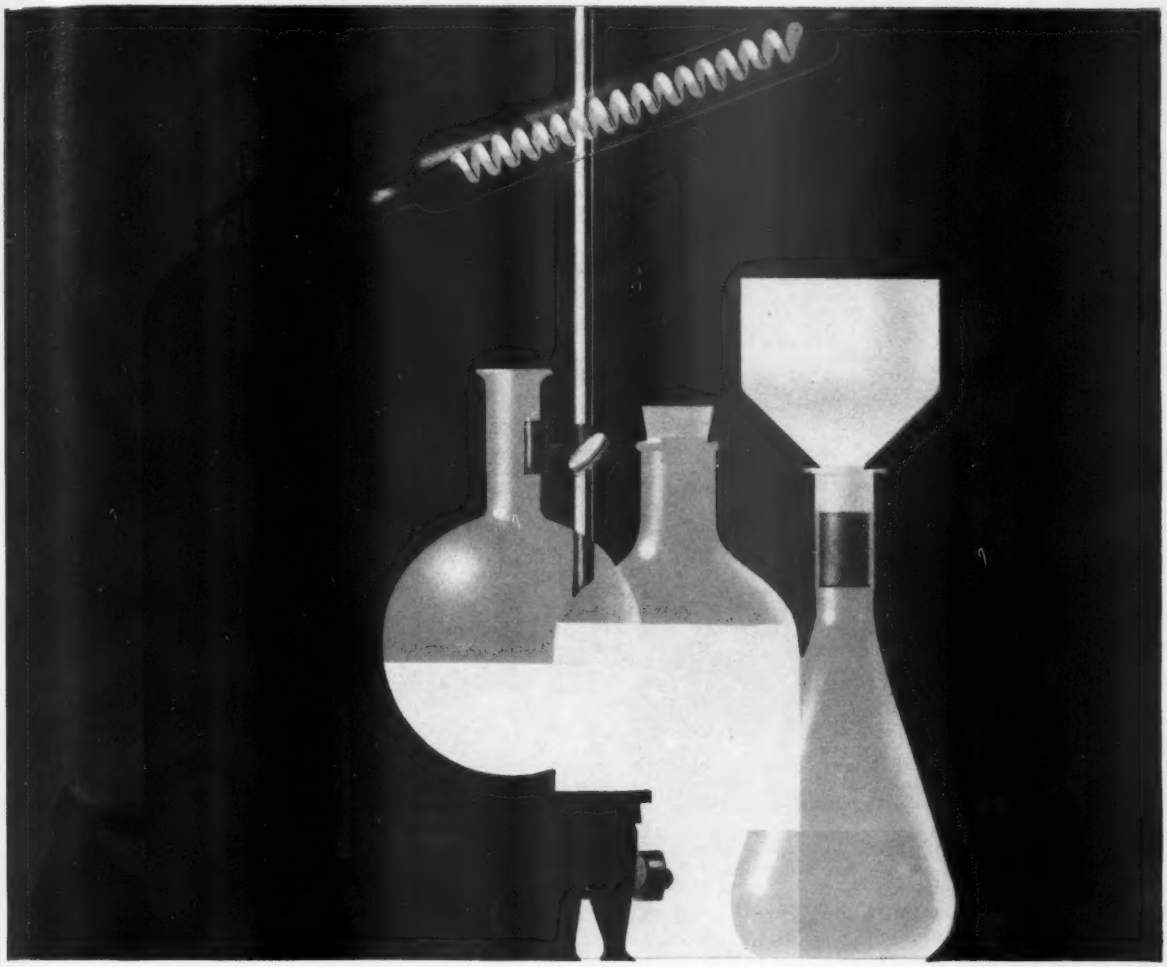
45-Year Record (Selected Years)

United States Paper Production, Imports Exports, and Consumption

(Quantities in Tons of 2,000 Pounds)

Year—	Production	Imports	Exports	Consumption Tons	Consumption Lbs., Capita	Year—	Production	Imports	Exports	Consumption Tons	Consumption Lbs., Capita
Newsprint											
1899	569,212			569,212	15.2	1929	1,409,169	2,422,700	18,695	3,813,174	62.8
1904	912,822		52,159	860,663	20.8	1934	989,705	2,209,698	23,405	3,175,998	50.2
1909	1,168,098		48,740	1,119,358	24.7	1939	954,259	2,615,129	13,495	3,555,893	54.2
1914	1,313,284	278,403	44,483	1,547,204	31.6	1941	1,043,999	2,982,375	70,265	3,956,109	59.9
1919	1,323,880	627,734	110,268	1,841,346	35.1	1942	967,211	2,921,207	41,595	3,846,823	57.8
1924	1,481,425	1,357,233	17,159	2,821,499	49.8	1943	811,309	2,637,429	35,256	3,413,482	50.3
						1944	720,752	2,491,000	31,000	3,180,752	46.8
Books											
1899	304,459			304,459	8.1	1929	1,497,912	3,406	27,567	1,473,751	23.9
1904	454,337			454,337	11.0	1934	1,055,247	4,730	12,066	1,047,911	16.6
1909	582,114	1,104		583,218	12.9	1939	1,546,930	13,749	22,463	1,538,216	23.4
1914	795,958	6,489	14,301	788,146	16.1	1941	2,025,891	28,506	51,752	2,002,645	30.4
1919	828,641	146	76,691	752,096	14.3	1942	1,704,029	28,000	56,954	1,675,075	25.2
1924	1,050,000	14,328	10,970	1,053,358	18.6	1943	1,592,878	28,000	31,566	1,589,312	23.4
						1944	1,435,785	28,000	31,500	1,432,285	21.1
Fine Papers											
1899	131,456			131,456	3.5	1929	635,662	1,613	16,660	620,615	10.2
1904	168,982			168,982	4.1	1934	434,870	879	10,263	425,486	6.7
1909	215,791			215,791	4.7	1939	613,995	573	20,498	594,070	9.0
1914	269,407		3,369	266,038	5.4	1941	950,014	159	46,783	903,390	13.7
1919	347,346		37,680	309,666	5.9	1942	1,055,475	300	47,000	1,008,775	15.2
1924	422,000	1,373	4,040	419,333	7.4	1943	1,020,601	300	47,000	973,901	14.4
						1944	974,372	300	51,500	923,172	13.6
Wrapping and Bag											
1899	535,252			535,252	14.3	1929	1,605,783	9,344	29,425	1,585,702	26.1
1904	644,291			644,291	15.6	1934	1,356,115	5,124	32,160	1,329,079	21.0
1909	763,067			763,067	16.8	1939	2,238,993	14,954	41,014	2,212,933	33.8
1914	911,029	18,258	7,067	922,220	18.8	1941	2,778,441	4,490	90,357	2,692,574	40.8
1919	858,464	2,401	49,408	811,457	15.5	1942	2,713,738	3,800	52,178	2,665,360	40.0
1924	1,235,000	25,540	18,520	1,242,020	21.9	1943	2,470,039	3,800	54,999	2,418,840	35.7
						1944	2,559,447	3,800	55,000	2,508,247	36.9
Tissue											
1899	28,406			28,406	0.7	1929	387,811	10,527	7,725	390,613	6.4
1904	43,925			43,925	1.1	1934	397,196	8,687	7,281	398,602	6.3
1909	77,745			77,745	1.7	1939	665,723	9,347	14,695	660,375	10.1
1914	115,401			115,401	2.4	1941	912,874	2,661	26,500	889,035	13.5
1919	190,561	245		190,806	3.6	1942	981,996	2,900	21,638	963,258	14.5
1924	242,000	6,795	4,368	244,427	4.3	1943	968,789	2,900	30,260	941,429	13.9
						1944	965,433	2,900	30,500	937,833	13.8
Paperboard											
1899	394,111			394,111	10.5	1929	4,451,187	42,351	94,374	4,399,164	72.4
1904	559,711			559,711	13.6	1934	4,073,261	20,936	51,159	4,043,038	63.9
1909	883,088			883,088	19.5	1939	6,104,968	28,610	103,384	6,030,194	92.1
1914	1,291,805			1,291,805	26.4	1941	8,399,960	36,882	141,250	8,293,592	125.7
1919	1,867,064	44,461	61,890	1,849,635	35.2	1942	7,969,184	36,000	127,309	7,877,875	118.5
1924	2,850,000	55,275	48,661	2,856,614	25.5	1943	8,620,434	36,000	86,398	8,570,036	126.4
						1944	8,962,568	36,000	86,500	8,912,068	131.0

Sourse: American Paper and Pulp Assn.



STAINLESS STEEL... METAL *Par-excellence* FOR THE PROCESS INDUSTRIES

MERITS OF ALLEGHENY METAL IN PAPER-MAKING

- ★Highly corrosion and heat-resistant
- ★Easy to form and weld
- ★Easy to clean and keep clean
- ★Requires little maintenance
- ★Low depreciation

THERE are a lot of new faces along the street—high-octane gas, synthetic rubber, magnesium, dehydrated foods, war chemicals and explosives, just to name a few.

But Allegheny Metal kept pace—with new grades, new techniques to meet the requirements for processing these products. There was the need for high resistance to chemical attack, and to oxidation at heat—the need for great strength, long life, easy cleaning and freedom from contamination—requirements, all of them, that stainless steel answers best.

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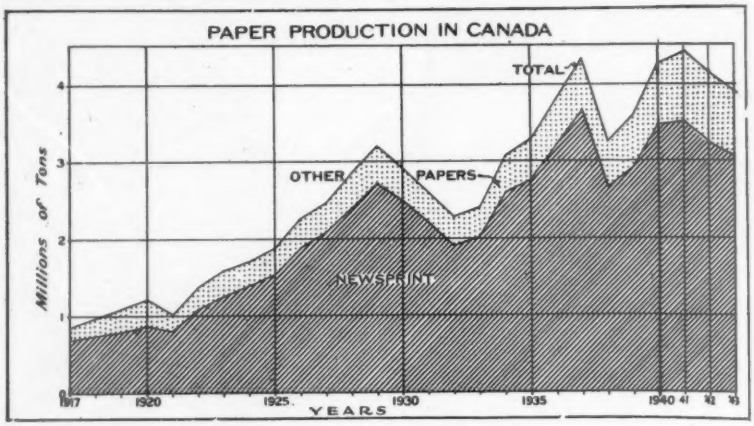
CANADIAN PAPER PRODUCTION (Selected Years)

	Newsprint		Total Paper	
	Tons	$ Value	Tons	$ Value
1917	689,847	38,868,084	853,689	58,750,341
1922	1,081,364	75,971,327	1,366,815	106,260,078
1929	2,725,331	150,800,157	3,197,149	192,989,252
1932	1,919,205	85,539,852	2,299,767	114,115,570
1939	2,926,597	120,858,583	3,600,502	170,776,062
1940	3,503,801	158,447,311	4,319,414	225,836,809
1941	3,519,733	158,925,310	4,524,776	241,450,292
1942	3,257,180	147,074,109	4,231,767	230,269,512
1943	3,046,442	154,290,163	3,966,344	235,362,958
1944*	3,265,000		4,165,000 (est.)	

Dominion Bureau of Statistics.
*1944 figures from News Print Service Bureau; include estimate for total paper.



Canadian paper production figures for latest available years, officially, were: Total paper—3,882,262 tons in 1943, 4,164,565 in 1942 and 4,449,598 in 1941. Total newsprint—3,046,000 tons in 1943, 3,257,180 in 1942 and 3,519,733 in 1941.

Unofficial figures for 1944—not shown in above chart—showed total paper production increased to slightly over 4,000,000 tons. Increase in newsprint was slight—about 9,000 tons.

waged 60 days without paper, it is just as true that without paper after the war, the civilian economy and civilization itself would collapse within 60 days—if not before then.

The Housley report forecast a 20,000,000-ton annual production of paper and board in U. S. mills by 1947 and if Canadian paper manufacturing increases in like proportion, that would mean a North American total production of nearly 24,500,000 tons — which is double the production of the 1930-39 period. Even in 1929—which most of us will remember as a "boom" year —total U.S.-Canada paper production was only 14,300,000 tons and in 1932 it had slumped to 10,296,000.

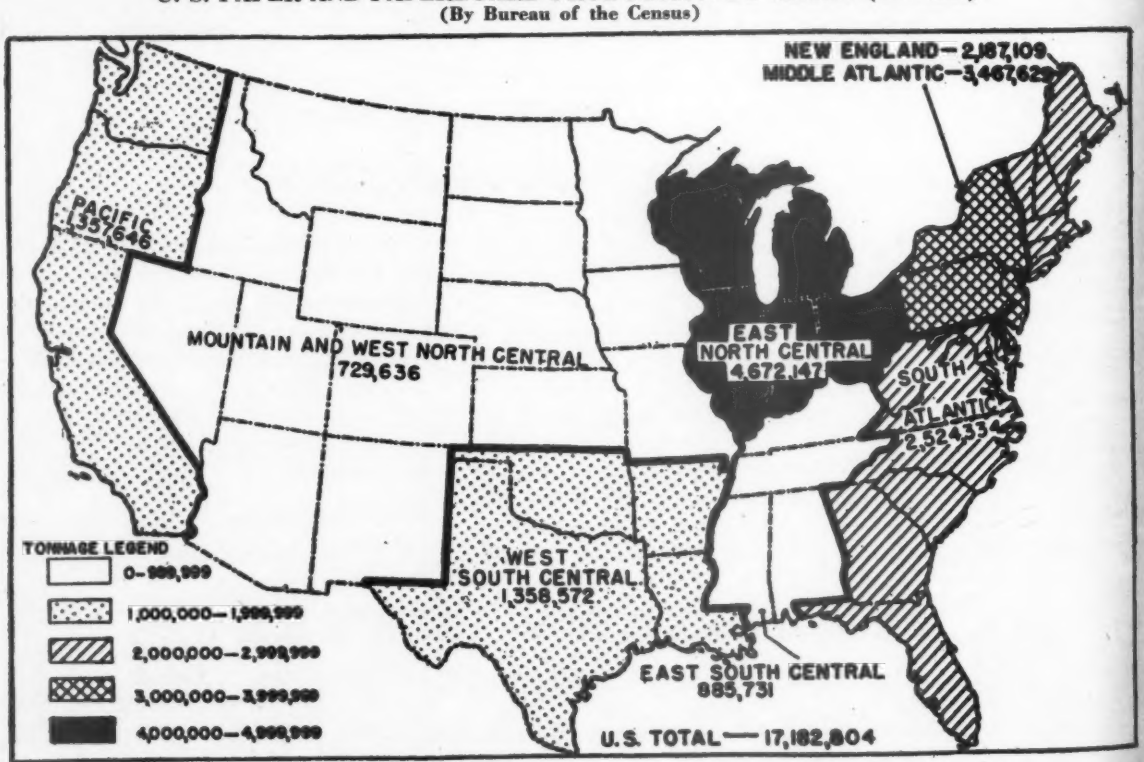
However, the availability of wood and pulp are going to be paramount after the war—as stressed in preceding articles of this issue. If the rate of wood pulp consumption goes back to pre-war standards, E. W. Tinker, executive secretary of the APPA. figures U. S. paper capacity at 18,740,000 tons by 1947. Figuring Canada on the same basis, the U.S.-Canada total would be 23,250,000 tons approximately.

Postwar Trends

Technical developments and improvements in paper and board have moved fast under impetus of war and these will be available for civilian supplies. The trends in many sections—the South and West par-

U. S. PAPER AND PAPERBOARD PRODUCTION BY AREAS (In Tons)

(By Bureau of the Census)



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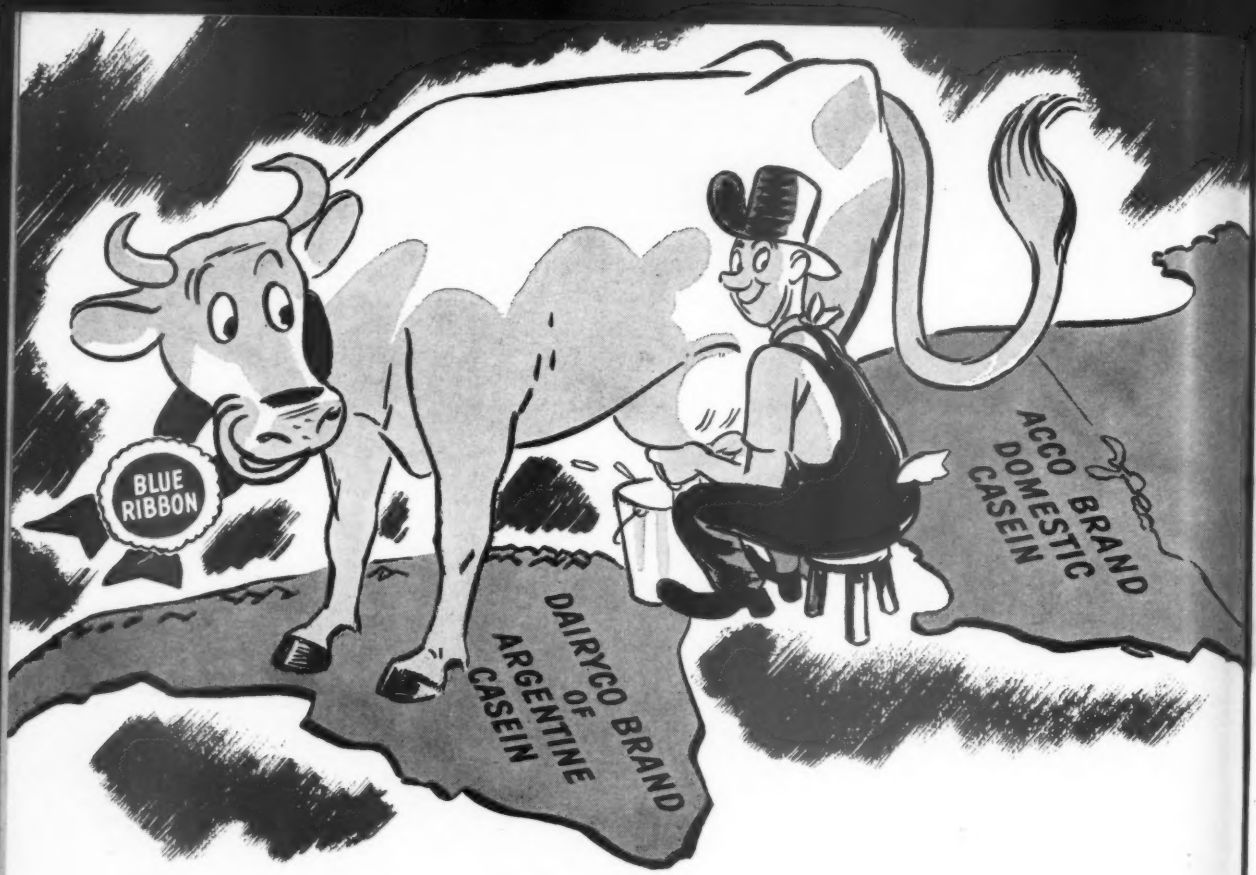

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ticularly—have been toward better grades, less competitive and drawing higher prices. Special grades have been developed and the post-war era will see much wider use of starches and resins. Normal weights will return to use in many grades and this will pose serious problems in costs. Many new uses for paperboard in self-service, preservation of foods, etc., have already been found successful.

After the war, the paper industry will find stiffer competition from rayon, plastics, etc. for pulp. Before the end of 1945, substantial imports of Swedish pulp were expected. The demands for paper and pulp in rehabilitating war-ravaged countries were extremely high—far too high in opinion of War Production Board officials, but there were expected to be substantial exports of paper from the U. S. at direction of military and occupation authorities. Russia and Scandinavian countries were expected to supply pulp.

Some of the wartime products for military that will gradually become available to greater extent among civilians were the special wet strength papers, waterproof solid fibreboard, vapor-barrier material, laminated paper, special industrial and absorbent papers.

New bleaching processes and improvements on old methods were opening up a big field for groundwood and kraft papers and tending to lower unit costs in white papers and greater demand for these grades.

Book and Fine Papers

U. S. book papers production totaled 1,435,785 tons in 1944—far below the peak of 2,025,000 tons in 1941, indicating a lot of catching-up to do in this field. Similarly, fine papers production total only 974,000 tons as compared with 1,-

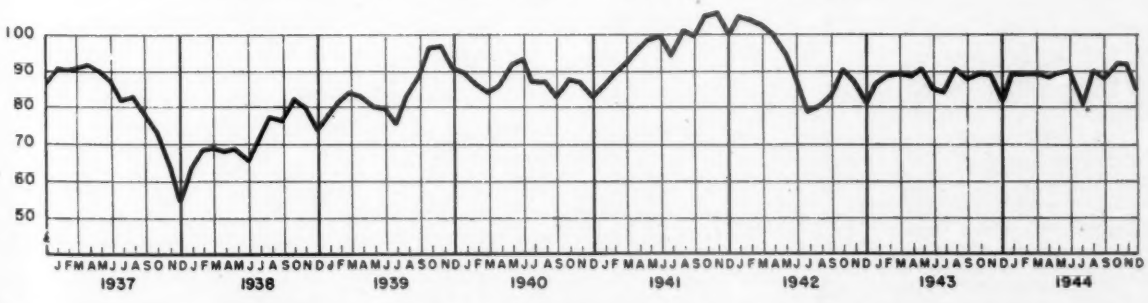
PRODUCTION OF PAPER AND PAPER BOARD, BY REGION AND STATE: 1942-1943-1944

(Tons of 2,000 pounds)

Region and State—	1942	1943	1944
Aggregate	17,083,862	17,035,688	17,182,084
Northeastern States	5,864,335	5,786,554	5,654,738
Maine	1,125,185	1,104,672	1,042,434
New Hampshire	198,929	200,060	194,979
Massachusetts	598,815	624,282	583,986
Connecticut	219,678	240,050	———
New York	1,649,451	1,523,945	1,537,911
New Jersey	835,429	866,472	854,198
Pennsylvania	1,111,197	1,099,372	1,075,520
Vermont	———	———	81,441
Rhode Island and Vermont	125,651	127,701	———
Rhode Island and Connecticut	———	———	284,269
Central States	5,295,715	5,423,719	5,401,783
Ohio	1,135,599	1,209,677	1,185,517
Indiana	304,396	328,074	339,449
Illinois	699,857	686,445	669,166
Michigan	1,238,736	1,272,429	1,262,987
Wisconsin	1,239,033	1,238,074	1,215,028
Minnesota	496,685	504,111	541,905
Iowa	61,357	64,987	———
Missouri, Kansas, Colorado	120,052	119,922	*187,731
Southern States	4,521,848	4,515,587	4,768,637
Dalaware	38,308	33,870	42,022
Maryland	195,294	197,920	———
Maryland, District of Columbia	———	———	214,210
Virginia	639,007	651,148	698,766
West Virginia	24,028	22,939	23,310
North Carolina	242,664	250,922	258,191
South Carolina	435,327	482,220	500,513
Florida	477,935	442,815	———
Georgia and Florida	———	———	787,322
Tennessee	170,949	178,449	176,890
Alabama	310,405	271,217	287,376
Mississippi	347,893	350,841	421,465
Louisiana	1,089,899	1,019,132	1,036,436
Texas	142,523	136,550	———
Arkansas and Texas	———	———	322,136
Georgia, Arkansas and Texas	407,616	477,564	———
Pacific States	1,401,964	1,309,828	1,357,646
Washington	665,402	598,704	635,476
Oregon	335,333	312,390	313,565
California	401,229	398,734	408,605

*Includes Iowa.
Source: U. S. Bureau of the Census.

MONTHLY RATIO OF PAPER PRODUCTION TO CAPACITY


100
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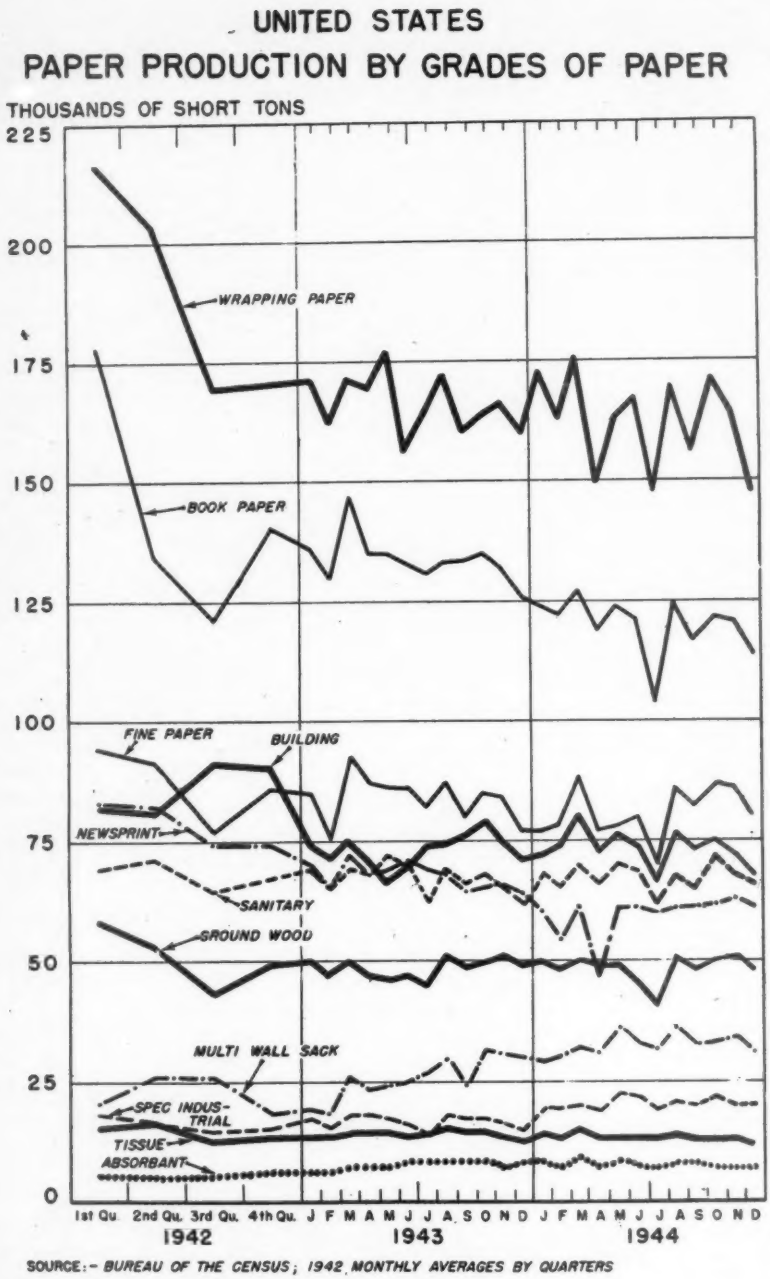
1937
1938
1939
1940
1941
1942
1943
1944

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.



055,000 tons in 1942.

Despite wartime restrictions, a Bulkley, Dunton Pulp Co. report observed that 400,000 books came off the press in the U. S. last year. It is intertsting to note that book publishers in the United States are allotted about 1½% of total paper production, while English publishers are allotted 15%.

In order to obtain the most out of the supplies available, publishers have decreased the average weight of books from 1½ to ¾-lb. by cutting margins, eliminating excessive fly sheets, and by using smaller type to permit more words per page.

One luxury item the publishers have not been able to dispense with is the heavy paper dust jacket, usually printed in eye-catching colors.

One of the most interesting ventures of the publishing field is the supplying of some 5,600,000 copies of popular books each month to members of the armed forces overseas.

Big circulation magazines were counting on greatly augmented circulations and publishing of western circulations on the Pacific Coast was a new trend that will tend to increase conversion of pulp in that area.

Newspaper circulations have reached high levels, and are discussed in the newsprint department of this issue.

Books, newspapers and magazines probably will retain some of the economies in spacing and makeup forced upon them during the war. Some of them have been found to actually improve the products.

Coatings, now mass-produced on increasing scale, probably will be used more extensively and in other ways the reading public will be encouraged and enticed into more reading. It has even been predicted that some coating will be used in the not-too-distant future in newsprint.

It only takes a little imagination to realize the tremendous demands that would be made for paper if utilization of it was increased only a fraction in some backward countries.

For instance, in Russia, the average person used only 12 pounds of paper per year in 1937 as compared with 248 pounds per person in U. S. In such countries as India, the percentage would be even less. In France it was only 36 pounds; in Italy only 26. It is conceivable that some day, these countries would utilize paper on the same scale as it was used in the U. S. before the war. This would require fantastic amounts and by 1941, U. S. per capita use had increased to 305 pounds.

In the U. S., the rag content writ-

U. S. WRITING PAPER PRODUCTION

	Rag Content Grades	Chemical Wood Pulp Grades	Total Writing Papers
1919	167,608	157,575	325,183
1921	120,046	110,866	230,912
1923	171,782	205,247	377,029
1925	127,173	346,631	473,804
1927	118,874	389,934	508,808
1928	116,000	434,472	550,472
1929	118,619	488,971	607,590
1930	100,510	474,171	574,681
1931	79,718	407,880	487,598
1932	61,088	363,210	424,298
1933	65,998	412,358	478,356
1934	70,355	347,504	417,859
1935	75,702	431,623	507,325
1936	84,945	517,384	602,329
1937	82,367	499,780	582,147
1938	69,468	442,251	511,719
1939	83,897	510,697	594,594
1940	93,414	506,038	599,452
1941	116,720	621,714	738,434
1942	169,946	683,522	853,468
1943	161,000	669,046	830,046
1944	168,700	622,300	791,000

Source: Writing Paper Mfgs. Assn.

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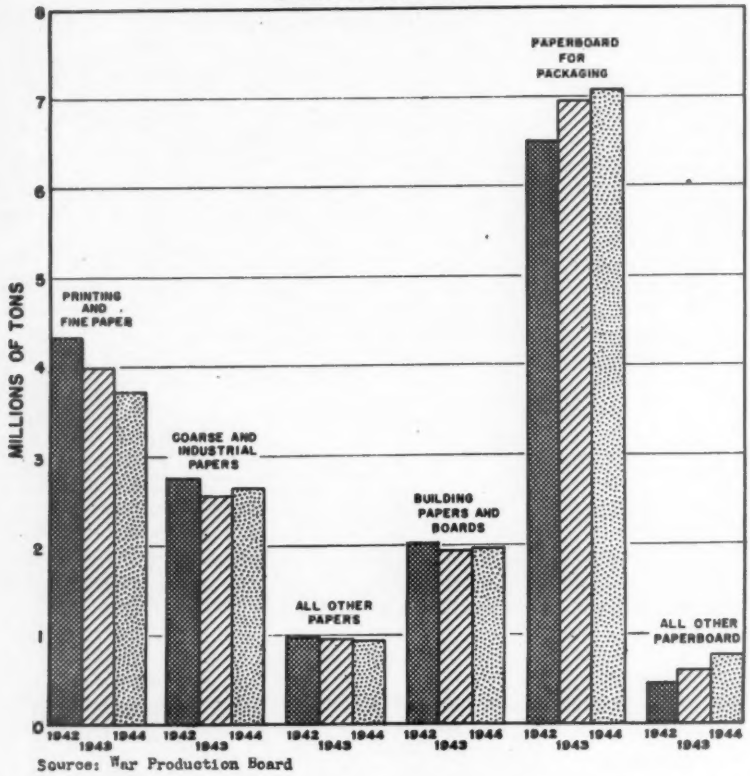
SINGLE MOTOR DRIVES FOR PAPER MACHINES

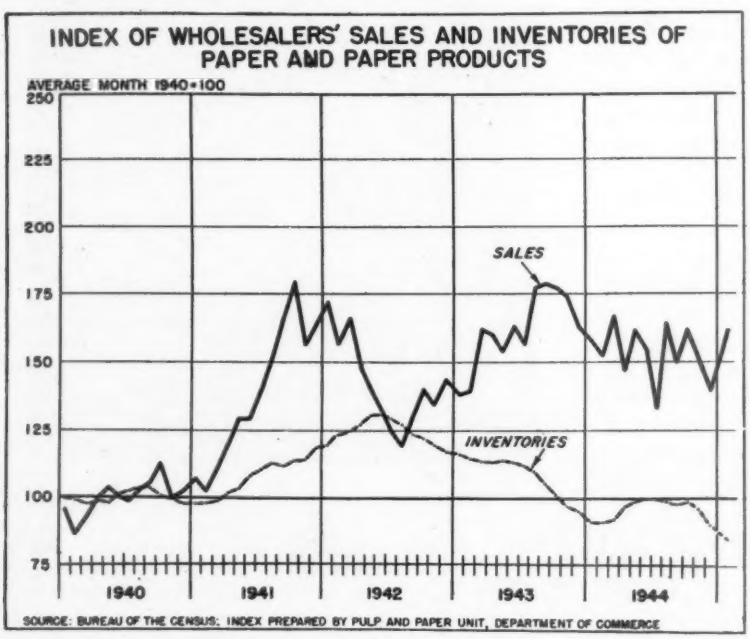
ing papers gained in 1944, over 1943, as shown in figures released by M. C. Dobrow, executive secretary of the Writing Paper Manufacturers Assn.

Production was 168,700 tons, approaching the all-time high of 1942. Production of chemical woodpulp grades, however, declined to bring the total for both under the 1943 production total. The figures are possibly not truly comparable for the reason that greater reduction of weight of individual papers has been effected during the past year. As a result, as much, if not more paper has been produced on a sheet count basis to meet the nation's wartime needs.

PAPER AND PAPERBOARD: UNITED STATES PRODUCTION
CLASSIFIED BY MAJOR USES; 1942-1944
(TONS OF 2000 LBS.)



Source: War Production Board



Tissue

Tissue production in U. S. totaled 965,000 tons in 1944 as compared with only 387,000 in 1929 and 397,000 in 1934. But it was just 3,000 less than in 1943 and below the peak figure of 982,000 in 1942.

Facial tissues, paper wadding for hospitals and other purposes, etc., are finding a new vogue and the improvement of their qualities have been such that a big postwar use of these papers is anticipated. The additions of machines for this type of production testify eloquently to the faith of the companies in its future.

Further sanitary education, new habits of soldiers and sailors, and greater availability of pulp make the paper towel and tissue future seem bright.

However, the improvement in manpower situation in laundries, the disposal of armed force surpluses and other factors may cut back much of this production.

Remarkable increases in greaseproof, glassine and parchment papers have already taken place and these are expected to continue. There will be a lot of catching up for civilians in coarse papers and bags, since they were cut back so heavily during the war.

Wrapping and bag production in U. S. was 2,559,447 tons in 1944, about 91,000 tons more than in 1943 but below 1941 (2,778,000) and 1942 (2,713,000).

Paperboard

U. S. paperboard production reached a record high level of 8,862,568 tons in 1944, in increase of 340,000 tons over the previous year and more than twice what it was in 1929.

W. Irving Osborne, Jr., president of the National Paperboard Assn., and also of Cornell Wood Products Co., wrote PULP & PAPER INDUSTRY that in his opinion the Housley forecast of a 9,280,00 tons annual production of paperboard in 1947 was reasonable, provided the production of consumers' nondurable goods are at least 150% of the 1936-39 average.

According to calculations of the National Paperboard Assn., demands of the armed forces have carried production of paperboard to a point

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- Bleaching Gumwood Sulfate Pulp . . . Bul. 241
- Cellulose Developments . . . . . Bul. 210
- Bleaching Procedure Design For High White High Strength Kraft Pulps . . . . . Bul. 233
- The Lime Chlorine System in the Preparation of Calcium Hypochlorite . . . . . Bul. 234
- Production and Use of Unsettled Bleach Liquor . . . . . Bul. 242
- Procedures and Brightness Grades in Bleaching Sulfate Pulps . . . . . Bul. 243
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PAPERBOARD MILL CENSUS.
In Tons

CONTAINER BOARDS

GRADES	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944
Liners - Jute	889,600	1,029,300	1,047,600	674,900	794,300	796,400	1,073,900	819,700	1,088,900	1,169,100
Liners - Kraft Cyl.	262,600	285,900	290,800	238,900	279,800	246,200	285,600	276,700	152,300	93,200
Kraft Four	289,600	389,600	461,600	638,200	803,800	923,300	1,201,400	1,174,600	1,252,900	1,340,400
Total Kraft	552,200	675,500	752,400	877,100	1,083,600	1,169,500	1,487,000	1,451,300	1,405,200	1,433,600
Total Liners	1,440,800	1,704,800	1,800,000	1,552,000	1,877,900	1,965,900	2,560,900	2,271,000	2,494,100	2,602,700
Chip-Corrugating	70,200	97,700	96,200	76,500	75,900	75,500	77,800	72,200	83,800	97,300
Solid Fibre	210,800	237,000	246,800	177,800	208,600	202,800	273,100	338,300	333,500	338,400
Total Chip	281,000	334,700	343,000	254,300	284,500	278,300	350,900	410,500	417,300	435,700
.009 Straw, Etc.	472,800	556,800	589,100	461,400	574,900	611,400	803,200	662,800	870,800	969,100
.009 Kraft	114,400	141,900	148,400	212,100	263,000	292,000	329,400	269,300	157,600	120,400
Total .009	587,200	698,700	737,500	673,500	837,900	903,400	1,132,600	932,100	1,028,400	1,089,500
TOTAL	2,309,000	2,738,200	2,880,500	2,479,800	3,000,300	3,147,600	4,044,400*	3,613,600*	3,939,800*	4,127,900*

BOXBOARDS

Folding Box	1,047,100	1,212,200	1,237,800	1,162,400	1,385,100	1,413,100	1,749,300	1,552,100	1,737,900	1,785,900
Set-Up Box	531,100	587,700	570,000	518,800	585,700	613,200	731,500	612,900	599,900	544,300
Total	1,578,200	1,799,900	1,807,800	1,681,200	1,970,800	2,026,300	2,480,800	2,165,000	2,337,700	2,330,200
Other	667,800	798,600	867,200	777,500	976,400	1,144,200	1,365,800	1,364,400	1,349,200	1,464,800
TOTAL	2,246,000	2,598,500	2,675,000	2,458,700	2,947,200	3,170,500	3,846,600	3,529,400	3,686,900	3,795,000

SUMMARY

JUTE,Chip,Boxboard Straw, Etc.	3,826,800	4,458,300	4,576,700	3,776,800	4,474,000	4,632,900	5,899,900	5,216,900	5,847,300	6,106,700
KRAFT,Liner,.009Etc	726,200	878,400	978,800	1,161,700	1,473,500	1,685,200	1,991,100	1,926,100	1,779,400	1,816,200
TOTAL ALL GRADES	4,555,000	5,336,700	5,555,500	4,938,500	5,947,500	6,318,100	7,891,000	7,143,000	7,626,700	7,922,900

Issued: March 26, 1945

*In addition, Canadian Imports were 106,200 42,100 16,800 9,200

NATIONAL PAPERBOARD ASSOCIATION

PAPERBOARD PRODUCTION BY ZONES
1944

Short Tons

Zone.	Liners	Corr. Material	Chip	Folding Boxboard	Set-up Boxboard	Other	Total
New England	62,500	14,600	31,600	190,300	57,100	110,000	466,100
Middle Atlantic	454,500	295,100	78,800	529,100	334,900	449,500	2,141,900
Lake States	539,600	404,400	177,500	792,300	98,200	599,100	2,611,100
South	1,292,900	254,600	40,500	80,800	21,600	175,900	1,866,300
Western	253,200	120,800	107,300	193,400	32,500	130,300	837,500
Total	2,602,700	1,089,500	435,700	1,785,900	544,300	1,464,800	*7,922,900

*In addition, Canadian Imports were 9,200 tons.
Western Group includes all states west of the Mississippi River with the exception of Texas, which is included in the Southern Group.

PAPERBOARD PRODUCTION BY ZONES
1943

Short Tons

Zone.	Liners	Corr. Material	Chip	Folding Boxboard	Set-Up Boxboard	Other	Total
New England	74,800	29,900	17,300	190,400	61,400	87,700	461,500
Middle Atlantic	456,200	224,500	85,700	493,600	370,700	406,600	2,069,300
Lake States	538,100	386,800	193,900	811,200	114,500	543,700	2,588,200
South	1,192,700	277,200	25,900	72,500	24,500	160,200	1,753,000
Western	232,300	110,000	94,500	170,200	28,700	119,000	744,700
Total	2,494,100	1,028,400	417,300	1,737,900	599,800	1,349,200	*7,626,700

*In addition Canadian imports were 16,800 tons.
Western Group includes all states west of the Mississippi River with the exception of Texas, which is included in the Southern Group.

where for more than two years it has constituted the majority of all paper production.

Up to 1943, U. S. production of paper, in the restricted meaning of the word, exceeded paperboard. Here are percentages for three years:

Year	Paperboard	Paper
1942	46.6%	53.4%
1943	50.4%	49.6%
1944	52.4%	47.6%

The military need of paperboard was demonstrated in the second quarter 1945 pulp allocations, which were cut 103,000 tons for paper, whereas they were increased by 21,000 tons for paperboard.

Peace In a Paper Package

A Survey of the Possibilities for Paperboard, Parchment, Glassine, Cellophane, Waxed Paper, Etc.

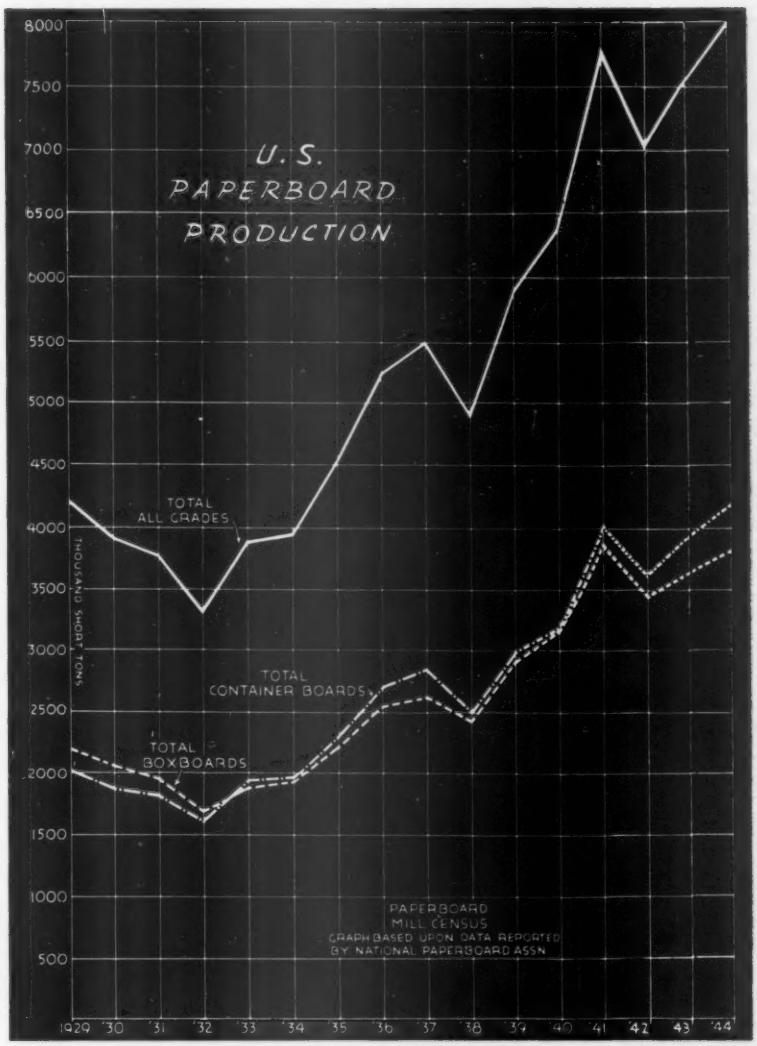
Nobody right now has a very clear conception of what life in peactime will be like. But one thing seems certain—it will be pretty largely packaged in paper.

There have already been laboratory developments of new types of paperboard, transparent paper, cellophane, parchment, waxed paper containers, display trays, packages, etc., for self-service in the markets and stores after the war. This is going to be a tremendous field, many users of paper products predict. Forward-looking paper companies have already made extensive studies of "pre-packaging," self-service conveniences, etc.

Waterproof and vaporproof paper and paperboard and some of the high strength V-box and other containers developed in the war are expected to have extensive civilian use. Hinde-Dauch Paper Co. has been a leader in developing new techniques for "pre-packaging" of all kinds of goods, thus saving much labor and time in handling from manufacturer to consumer.

What many in the industry feel about paper packaging has been typically expressed by L. W. Sutherland, chairman of the board of the Sutherland Paper Co., Kalamazoo, Mich. He believes that the future of the paper industry in general is bright, but is particularly optimistic for the carton and container branch. He believes that paper will retain a great part of the field in which it has entered as a substitute. He points to one instance of a manufacturer who used nothing but tin cans before the war and has already offered to sign a contract for several million paper containers for deliveries after the war. There are, he says, many similar instances.

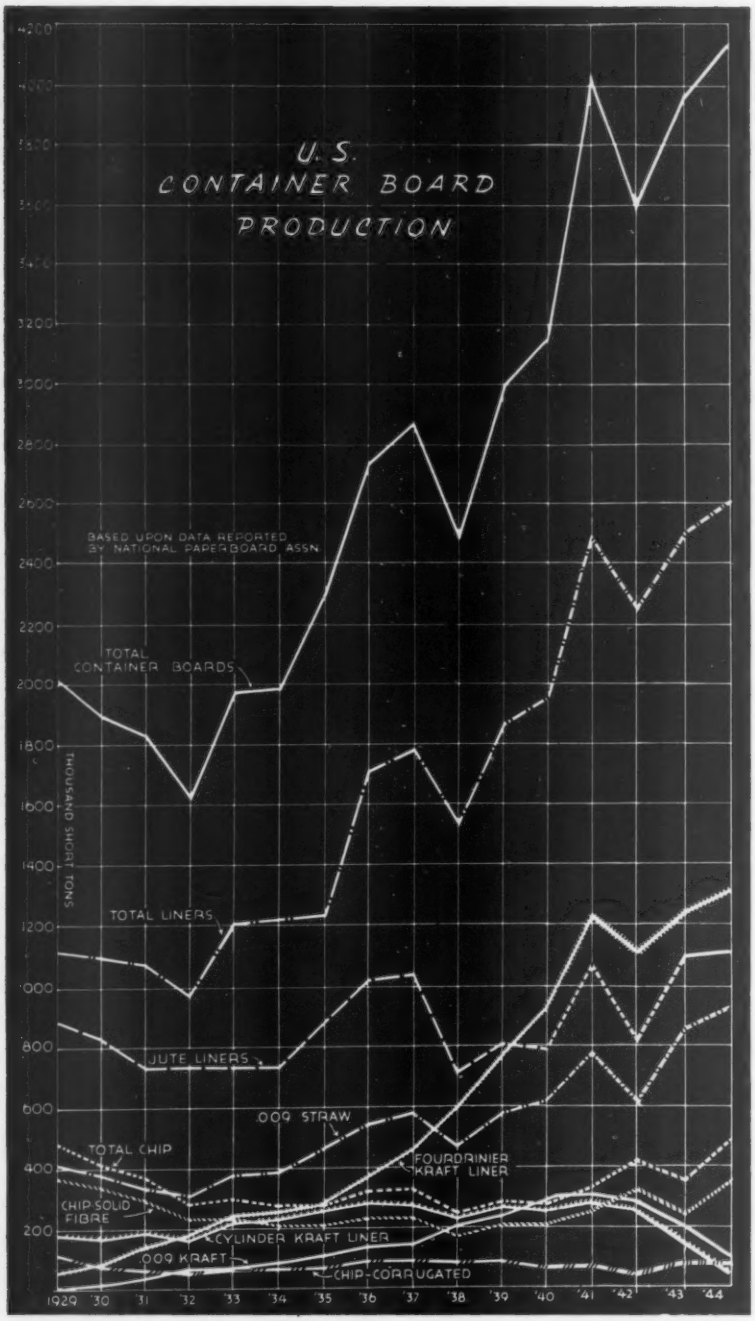
In attempting to get a line on the opinions of the food and food merchandising fields as to paper packaging, PULP & PAPER INDUSTRY made many inquiries among the prospective users.



The meat packing industry expects, for instance, that the use of new packaging materials will gradually increase in the postwar period over the pre-war levels. For a number of years there has been a trend in that industry toward packaging a greater number of meat products. The actual volume may be small in the initial peace years, but some packers are already anticipating going into quick frozen, fresh meat and the ready-cut fresh meat field. It is said, too, that most packers are being open-minded on the subject of a more satisfactory container for lard.

Grocery Field

Opportunities in the grocery field appear endless. Says Carl W. Dip-



man, editor of The Progressive Grocer: "When once we pass from the period of shortage to one of plenty, we expect a sharp increase in the use of paper in the food industry. Then for many years after the war we expect a gradual, but continuous increase in the consumption of paper for the production, processing, and distribution of food.

"In retail stores self-service and cash-carry merchandising call for a rising paper consumption by merchants for bundling consumers' packages. We expect the cash-carry and self-service trends to continue and to increase.

"Immediately after the war there is expected a marked increase in the number of processed foods available. There will be perhaps hundreds of new products on the market, nearly all packaged. Of course some of these packaged foods will require metal and glass containers, but a great many will require paper and cellulose enclosures.

"The food trade expects a rapid expansion of the frozen food industry. At the consumer level this expansion will require more paper products for processing foods in locker plants and home freezers. Commercial packers of frozen foods will apparently enjoy a tremendous increase in their business.

"We look to a sharp increase in the packaging of some foods that heretofore have been largely sold in bulk. Among them are fresh fruits, vegetables, meats, and other items. Some of the packaging will be done by original producers and processors, yet a great deal of it will take place in retail stores. This will call for an increase in the consumption of packaging materials of all kinds, with both the original packer and the retailer.

"There should be an increase in the self-service of fresh meats, fruits, delicatessen items and similar lines in our retail stores. To prepare these foods for self-servicing merchandising will require substantial quantities of paper and cellulose cartons, cups, and various kinds of containers. Consumer containers for such items as eggs, beverages and other products, should also be popular."

Jerry H. Young, whose merchandising manual represents more than 20,000 cooperative grocers in the Chicago area, believes that there is no question about the fact that wartime operations have given the home maker a new insight into the importance of visibility in packaged foods. Cellophane, parchment, glassine and perhaps even transparent plastics, he believes, will be serious contenders for extensive postwar package business.

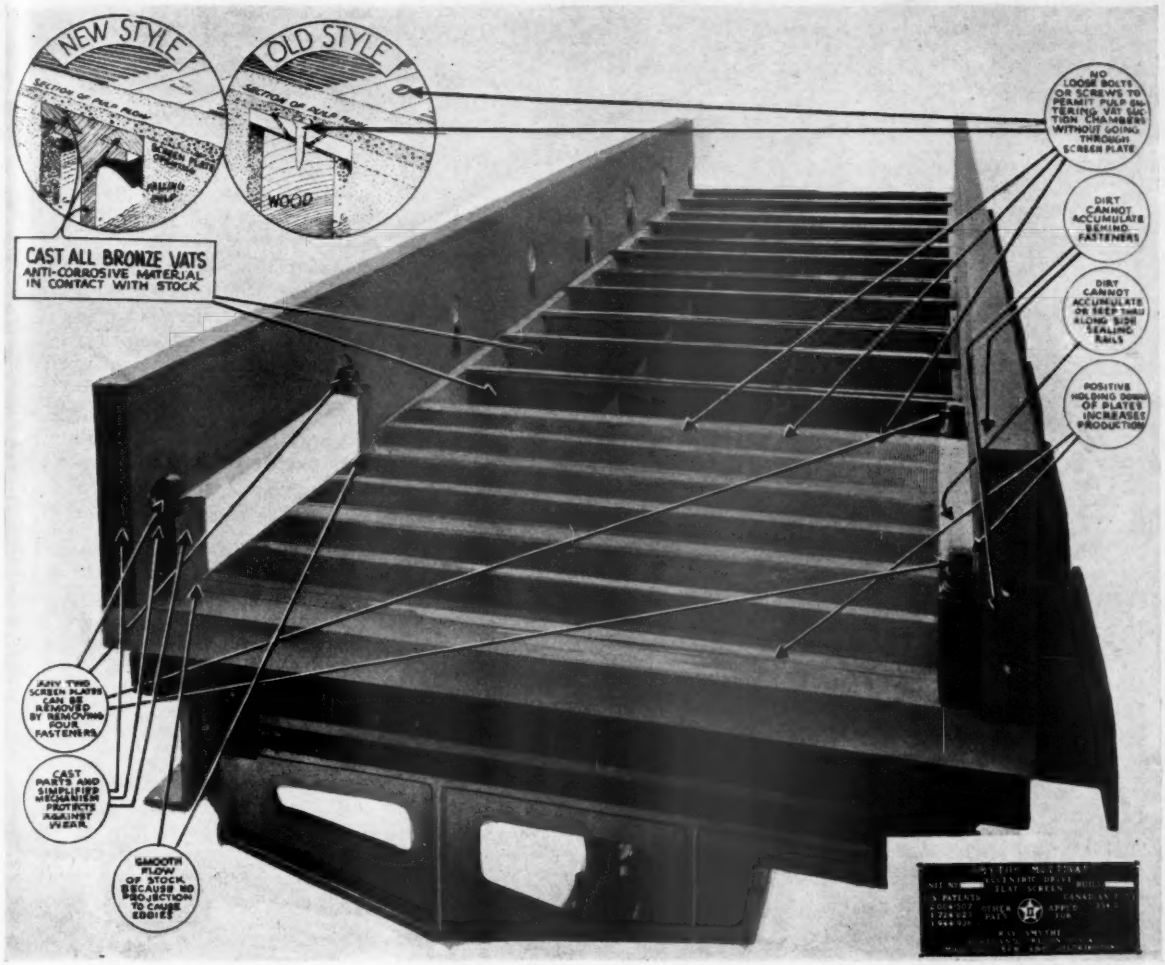
Frozen Foods

Some figures on the frozen fruit pack are of significance. About 50% of the frozen fruit pack in the U. S. is produced in Washington and Oregon and a table on page 108 shows how rapidly paper has advanced as a packaging material in comparison with wood and tin.

It is possible that some of the packers who formerly used tin cans, but who have learned to use and like fibre packages, will continue to utilize paper when tin is once more available.

The trend toward self-service in food stores will bring marked changes in the packaging and display of frozen foods, according to M. C. Pollock, of the cellophane division, E. I. du Pont de Nemours & Co.

Surveys indicate a desire on the part of self-service food stores to show as much frozen food as pos-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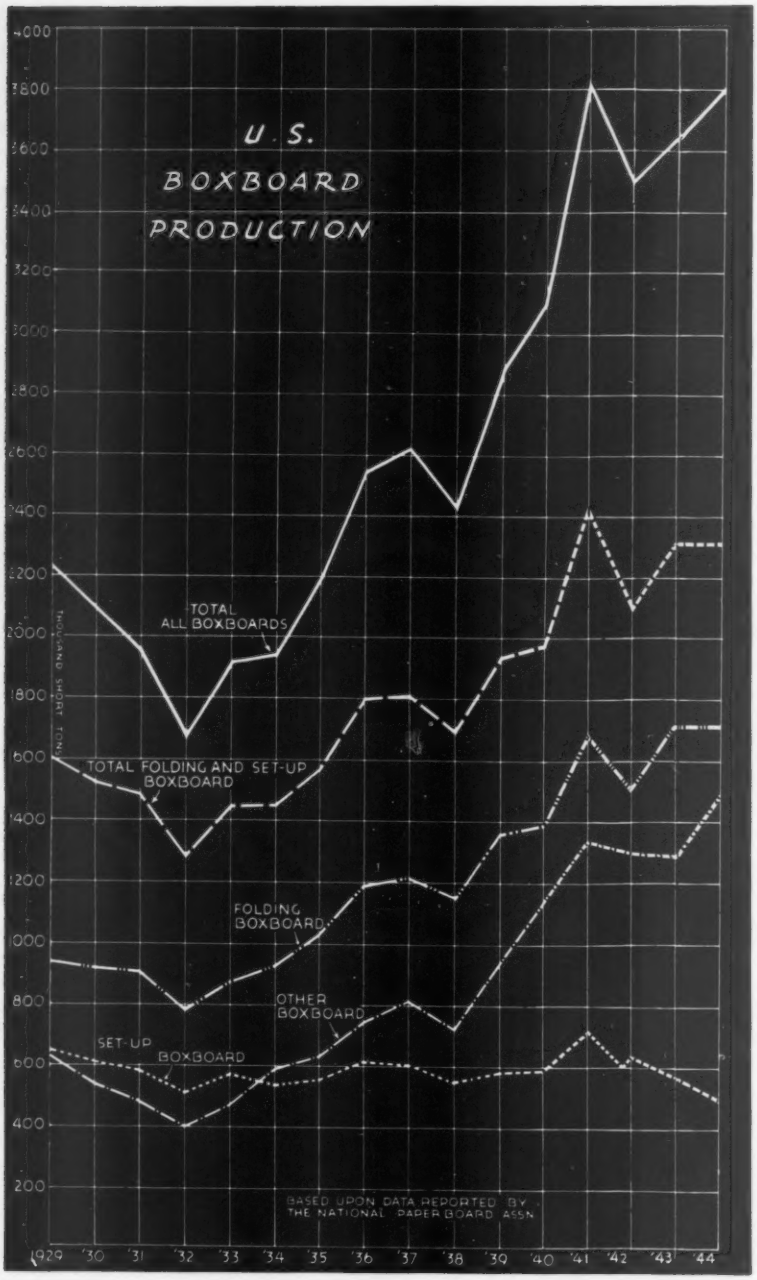

sible, he said. As a consequence, many ingenious retailers have altered present-type cabinets so that customers can both see the packages and serve themselves. Special units have been installed by numerous retailers, he said.

Manufacturers of refrigeration equipment for retail stores, recognizing the need for improved methods of displaying frozen foods, are developing cases that combine maximum self-service display value with the necessary degree of refrigeration to hold foods in the frozen state.

Packaging of frozen foods is also due for some radical changes, he predicted, to keep step with the trend toward open display. He said that the special conditions of self-service operations impose certain requirements on packaging and display to which the frozen food processor must gear his product in order to fit into this method of merchandising.

Fast turnover is one of the prime requirements of self-service, explained Mr. Pollock, adding that to accelerate fast turnover, the package must command attention, tell its own story, have convenience value, and offer the necessary degree of protection.

Wider use of transparent films in food packaging, with newer, war-developed films broadening the field in specialized applications, is foreseen by the du Pont company.

New type films with improvements beyond those now generally known will become available as standard commercial materials. It is expected the newer films will broaden the field of transparent packaging materials instead of resolving themselves as competitive to previously established types.

Technical progress in the development of new transparent films has been very rapid.

Postwar Prospects

Western Canner & Packer invites attention to certain readjustments which will take place in food production after the war. It says: "In food production, the war has resulted in (a) a very large expansion in vegetable dehydration—from a prewar of 5,000,0000 lbs. of vegetables a year to about 250,000,000 lbs. a year today; (b) a considerable gain in canned vegetable output—from 160,000,000 cases prewar to 220,000,000 cases today; (c) no important change in the total canned fruit and fruit juice pack; (d) some expansion in dried fruits—from 500,000 tons prewar to 600,000 tons today; (e) a large gain in dried beans and peas—from 800,000 tons prewar to 1,600,000 tons today; (f) a slight decline in canned fish packs, due to cuts in salmon packs largely; (g) a large jump in glassed food packs—from 90,000,000 cases prewar to 150,000,000 cases today; (h) a large gain in frozen vegetable packs, from 80,000,000 lbs. prewar to 220,000,000 lbs. in 1943, probably nearly 300,000,000 lbs. in 1944; (i) an increase in frozen fruit production from 150,000,000 lbs. prewar to 220,000,000 in 1943 and probably 300,000,000 in 1944. These are total U. S. figures, in round numbers.

"Postwar there will be some readjustments. Probably (a) a sharp decline in vegetable dehydration, not to the prewar level, but well below the wartime maximum; (b) some decline in canned vegetable output, because the present production is supplying armed forces and civilians; (c) smaller packs of some canned fruits and juices, larger outputs of others, to maintain the present output level; (d) return of dried fruit packs to prewar level; (a) return of dried beans and peas to near

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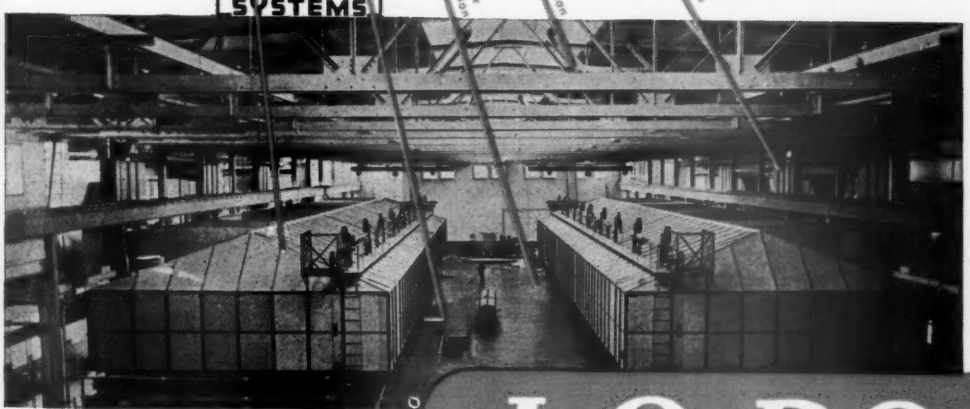
ROSS SYSTEMS



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PRODUCTION OF CONSUMER CONTAINERS, 1940-1944

Kind of Container—	Unit	1940 Quantity	1940 Index	1943 Quantity	1943 Index	1944 (Est.) Quantity	1944 (Est.) Index
Metal cans	Thous. tons steel	2,180	100	1,686	77	2,044	94
Metal crowns	Thous. gross	143,929	100	216,151	150	226,250	157
Commercial closures, metal	Million units	5,677	100	7,898	139	8,625	152
Glass containers	Thous. gross	52,116	100	92,707	178	104,000	200
Home canning seals	Thous. gross	10,000	100	31,836	318	23,500	235
Milk bottles	Tons	n.a.	.....	n.a.	.....	70,900	.....
Hood and lid cover stock	Tons	n.a.	.....	n.a.	.....	20,700	.....
Liquid tight cylinder cans	Tons	n.a.	.....	n.a.	.....	32,500	.....
Cups & round nested food containers	Tons	n.a.	.....	n.a.	.....	92,400	.....
Ice cream, frozen food, butter cartons	Tons	n.a.	.....	n.a.	.....	117,400	.....
Milk bottle plug caps	Tons	n.a.	.....	n.a.	.....	27,900	.....
Folding boxes	Thous. tons	1,398	100	1,722	123	1,773	127
Set-up boxes	Thous. tons	613	100	600	98	498	81
Fiber cans and tubes	Thous. tons	n.a.	.....	307	.....	360	.....
Groc. & variety bags	Thous. tons	606	100	518	85	317	52
Specialty flexible containers, inc., handmade bags & carton liners	Thous. tons	n.a.	.....	105	.....	126	.....
Factory pre-packaging bags	Tons	n.a.	.....	25	.....	25	.....
Collapsible tubes	Thous. gross	3,755	100	5,050	134	5,565	148

n.a. Not available.
Source: Department of Commerce estimates.

OREGON-WASHINGTON FROZEN FOOD PACKS

(About 50% of U. S. total)

Year—	Wooden barrel pack lbs.	Tin can pack lbs.	Paper box and carton pack lbs.	Total pack lbs.
1926-30 average	33,400,000	11,510,000	25,000	44,935,000
1931-35	36,365,000	7,047,000	692,000	44,104,000
1936-40	39,900,000	10,910,000	8,165,000	58,975,000
1943	59,146,000	3,332,000	39,062,000	101,540,000

prewar level; (f) recovery of canned fish packs to prewar level; (g) continuation of glassed food packs at levels now being maintained; (h) continuation of frozen vegetable packs at present level postwar, and perhaps some increase; (i) continued increase postwar in frozen fruit packs."

Glass-Tin Competition

A great pre-war advantage of metal containers was due to the development of modern high-speed machinery for packaging. Can-closing machines were, and are, highly mechanized and very fast. However, during the war the builders of wrapping and sealing machines for paper containers have largely caught up. The tin can line leads in the food field, but the gap is ever lessening. In certain non-edible products paper packaging machinery equals or exceeds the production possible with glass or tin.

The paper industry has been reasonably quick to present cylindrical and rectangular types of containers. Bags have been increasing in use, especially due to the "loose-freeze" method. But, as was brought out several times at the national convention of the Packaging Institute last fall, there is much to be done in educating the public to the fact that paper containers are acceptable, especially for food. For example, the Borden Co. is perfectly satisfied with board containers with a bag liner for packaging malted milk for the soda fountain trade. Not only is the container cheaper than the old metal package, but it keeps the product quite as well. But the soda fountain owners don't believe in it. Result: Borden will return to metal after the war. "We're selling malted milk," one executive of the company put it. "We haven't got time to sell paper containers."

Misguided writers in the trade press going to users of containers persist in referring to paper containers as "substitute containers." No question about it, observers in marketing say, the board container people and the makers of paper cartons must jump to sell the market just as completely as they took a large segment of the business away from the wooden box industry. Certainly they will have the help of large industries using paper and board containers—manufacturers of reputable products who certainly do not want the consumer to feel that these products are carried in "substitute" materials.

For years the Pacific Coast fisheries have been chiefly noted for their production of tinned salmon, tuna and sardines. Its marketing of fresh fish, exclusive of halibut which is sent frozen to national markets, has never compared with the industry on the Atlantic coast. Already we find this changing. One large Pacific Coast fishing firm is undergoing tremendous physical expansion based almost entirely upon an idea for packaging fresh fish in paper cartons.

It was the war itself which showed the world what paper could do as packaging. Cartridge cases, ration boxes, containers for medical supplies, these and many other items are required in great quantities and under very adverse conditions as to shipping and climates. Military security has more often than not laid a cloak of secrecy over paper's accomplishments in war packaging, but when the real story is told much more of the resistance to paper packaging will have been eliminated.

New Paper Uses

Radio and electrical fields are now making considerable use of paper in such items as fiber conduit, fibre connectors with rubber rings, fiber caps and elbows, radio speaker housings, protectors for loud speaker magnets, speaker cones, flashlight holders and cases, electrical fence controllers, insulator boxes, panel boards, reflectors for lighting fixtures, telephone sets, and instrument cases.

Vital War Goods

● Add to vital war goods — new emergency airfield runway material made mostly of tar-soaked paper. Also, 52 pounds of paper cover for shipping each Red Cross ambulance. Pulp and paper are said now to go into 700,000 necessities of war.

Wasted Waste Paper

New York newspapers scolded its citizens for dumping about 1,000 tons of waste paper out of windows on V-E Day, and an unestimated amount on the following, so-called "official" V-E Day. The press reminded celebrants that 1,000 tons of paper would provide 20,000 blood plasma containers, make several thousand cartons for 75mm shells, and make, among other things, 150,000 boxes for lifeboats—all for use in the war against Japan. Actually, however, New York's celebration was much restrained, and the shadow of the Pacific war definitely kept many more thousands of tons of paper from going out the windows of Manhattan and environs.

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EXPORTS and IMPORTS--Lowest in 20 Years But mid-1945 Finds Both Turning Upward

Production and consumption of paper and paperboard in the United States have been of such tremendous volume—in comparison with the rest of the world—that exports and imports of paper and board seem almost insignificant in their importance to this country. But even comparatively minor shifts in these categories can have an important bearing on the prosperity of the industry and employment of American labor.

Since the beginning of the war there have rarely been any official figures released. Some releases have been the result of agitation in Congress and in the press. This has given rise to a great deal of exaggeration, especially as to the newsprint situation. The department on newsprint in this issue deals with that subject at more length and reveals that U. S. newspapers have not really suffered because of any diversions of newsprint to other countries or because of a slight slackening of imports from Canada.

The issue of Reciprocal Trade Agreements and the overall question of relief for the liberated countries in Europe and elsewhere, however, raised some serious foreign trade problems. Exports of pulp and paper threatened to get out of hand, but the end of the European war—making possible use of Swedish paper and pulp—and the strong representations made in Washington by the paper industry, has improved the outlook.

There probably will be exports of quantities of paper to Europe and Latin American countries, but the fantastic figures bruited about in Washington early in the year are going to be considerably whittled down. As far as immediate relief aborad is concerned, the government has agreed to heed the industry's desire to serve "natural" markets. Pulp has a "natural" market in Latin America; paper may have to some extent in Europe. Imports however, posed different problems. D. K. Brown, president of the American Paper & Pulp Assn. and of Neenah Paper Co., told a Washington hearing on the trade agreements that "the paper and pulp industry has no quarrel with the argument that we must have more international trade if there is to be peace on earth and that the United States cannot, year after year, export unless it imports in substantially equal dollar volume so as to create dollar exchange with which payment can be made for our imports.

"But the industry does believe," he said, "that tremendous paper imports created by earlier trade agreements prove that the industry has already contributed far more than its share toward this objective, and that the American people have no desire further to displace American paper and pulp employes and lose a basic American industry in an attempt to reach this goal."

Tables accompanying this article show that there have been no really established trends over the past 50 years in foreign trade in paper except the steadily increased imports of newsprint from Canada.

PAPER AND PAPERBOARD: Production in Selected European Countries,

(Tons of 2,000 pounds)

Country	Production 1937
Austria	346,386
Belgium	263,670
Czechoslovakia	349,429
Denmark	84,667
Finland	834,368
France	a/ 936,900
Germany	3,933,238
Italy	562,791
Netherlands	268,708
Norway	512,799
Russia	1,007,503
Sweden	1,172,497
United Kingdom	b/ 2,575,000
Total	12,847,956

a/ 1929 production, latest available data. Production is believed to have increased considerably since then.

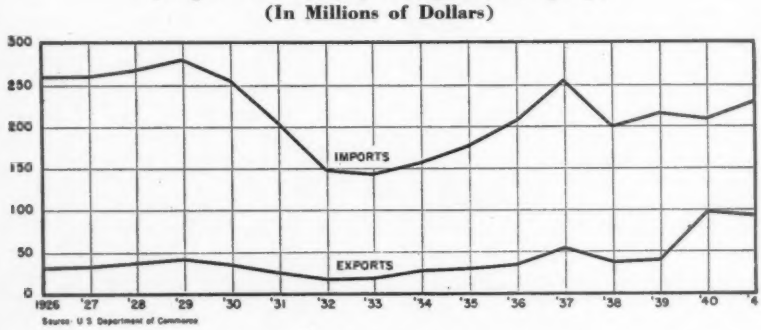
b/ 1935 production, latest available data.

Source: Bureau of Foreign and Domestic Commerce, World Paper Consumption, 1927-38.

TOTAL VALUE OF U. S. PULP AND PAPER FOREIGN TRADE

(Imports are chiefly newsprint and pulp)

(In Millions of Dollars)



Source: U. S. Department of Commerce

Export Trend

Exports of all types of paper are

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Hoquiam, Washington

PORT ANGELES DIVISION
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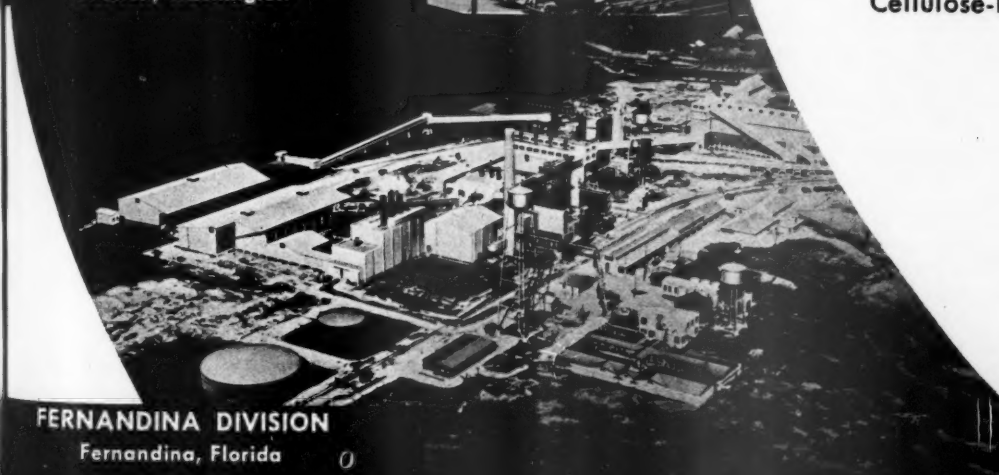

FERNANDINA DIVISION
Fernandina, Florida

PAPER AND PAPERBOARD: Annual rate of United States Production Based on Highest Quarterly Production Attained in the Last Six Months of 1941 and First Six Months of 1942.

(Tons of 2,000 lbs.)

Grade	Highest Quarterly Production, 1941-1942		Annual Rate Based on Highest Quarterly Production 1941-1942*
	Period	Production	
Total Paper and Paperboard	--	4,941,709	19,766,836
Total Paper	--	2,565,902	10,263,608
Newsprint	4th Qt. 1941	255,354	1,021,416
Groundwood	1st Qt. 1942	174,049	696,196
Book	1st Qt. 1942	533,449	2,133,796
Fine	1st Qt. 1942	280,630	1,122,520
Coarse	1st Qt. 1942	647,446	2,589,784
Shipping Sack	2nd Qt. 1942	78,443	313,772
Special Industrial	1st Qt. 1942	54,940	219,760
Sanitary	2nd Qt. 1942	212,387	849,548
Tissue	4th Qt. 1941	48,075	192,300
Absorbent	4th Qt. 1941	36,422	145,688
Building Paper	1st Qt. 1942	244,707	978,828
Total Paperboard	--	2,375,807	9,503,228
Container Board	1st Qt. 1942	1,085,079	4,340,316
Folding Boxboard	1st Qt. 1942	488,841	1,955,364
Set-up Boxboard	1st Qt. 1942	318,031	1,272,124
Cardboard	4th Qt. 1941	19,629	78,516
Miscellaneous Board	4th Qt. 1941	209,715	838,860
Building Board	2nd Qt. 1942	254,512	1,018,048

* It is recognized that the total rate attained by adding production during each highest quarter for the period under consideration may permit some duplication where shifts in production of paper or paperboard have taken place. It is felt, however, that such duplication is not of sufficient importance to make a significant change in the data shown.

somewhat higher in war years than previously. Good neighbor policy with Latin America and propaganda aims abroad in conduct of the war have been influences in this regard. Paperboard and bag exports took a big jump 1939-41, but army demand at home cut this down. Some other grades of paper followed similar trends, exports dropping off as needs at home increased.

During the past year, the Department of Commerce released the first official data since the war started on exports. These are shown in a full page table with this article, showing some interesting trends through 1943, on wood, pulp, different paper grades and various converted products. Thus far this year, there has been no further information divulged to bring the statistics up to date, except in the case of newsprint.

Total exports of the major categories of paper were 258,063 tons in 1943 compared with 258,586 tons in 1939, a decline of a fraction of a per cent. Newsprint exports were 161% higher in 1943 than in 1939, but dropped off in 1944 to only 31,000 tons (4,000 tons less than in 1943). As a group, wrapping paper registered a 42% gain in 1943 over 1939, with greaseproof and waterproof papers rising 276% and kraft wrapping 58%, but wrapping, except kraft, falling 28%.

Total paperboard exports in 1943 were 10% below 1939. While kraft container board exports dropped 46% in 1943 compared with 1939, the other types of paperboard increased during the same period.

It is likely that the export picture will change very rapidly, with the European war over, with some grades moving upward sharply.

Foreign Competition

The paper industry was, naturally, more concerned over imports. Because of paper trade agreements, imports of paper and pulp into the United States are far larger than the imports of any other commodity. In 1938, for example, importations of paper and pulp amounted to over $185,750,000, approximately 25% more than the importation of coffee, the next largest commodity and still a larger percentage above cane sugar, crude rubber and raw silk, the three next largest importations; all of which are produced either in very small quantity or not at all in the United States. Paper and pulp imports were over twice as large as those of chemicals, which constitute the second largest importation of manufactured goods produced in substantial quantity in the

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Pacific Coast Representatives: Pacific Coast Supply Co., Public Service Bldg., Portland, Ore.; 343 Sansome St., San Francisco, Calif.

United States. That last pre-war year is no exception; the facts are the same for the ten-year period, 1930 to 1939. No other imported commodity came anywhere near equaling paper and pulp. During that same period the net dollar exchange created by the absorption of imported paper and pulp by the paper market of the United States was $1,635,889,799. Total imports in these years were $1,957,438,412 and exports only $321,548,613.

In discussing Reciprocal Trade Agreements, D. K. Brown pointed out that the paper industry is particularly sensitive to foreign competition.

"It is unique," he said, "among American industries in being forced to compete with foreign nations whose production methods and abilities are identical with ours, but whose wage rates are substantially lower than the wage rates of American workers in comparable jobs. The result of this situation invariably is that the country with the lowest wages and the poorest standard of living is automatically the lowest cost producer of paper. Every papermaking country in the world is a lower cost producer of paper than the United States."

NET DOLLAR EXCHANGE CREATED BY U. S. PULP AND PAPER INDUSTRY

(Dollar value of imports less dollar value of exports)

1926	$229,212,000	1933	$124,308,000
1927	230,640,000	1934	130,764,000
1928	231,665,000	1935	145,068,000
1929	239,231,000	1936	174,228,000
1930	219,902,000	1937	199,785,000
1931	174,679,000	1938	161,785,000
1932	130,500,000	1939	174,871,000

Source: "Foreign Commerce and Navigation of the United States," Bureau of Foreign and Domestic Commerce, Department of Commerce.

In a recent report by the American Paper & Pulp Assn., it was contended that the paper industry was already absorbing its full share of imports. It stated:

"Owing to the inclusion of standard newsprint and wood pulp in the free list, the U. S. paper market absorbed the highest imports of any commodity market during the prewar 1930's. The net dollar exchange thus created, after deducting exports taken from this pulp and paper market, was $161,785,000 in 1938; a prewar maximum of $239,231,000 was reached in 1929 and a prewar minimum of $124,308,000 was set in 1933.

"This dollar exchange was available to foreign buyers of exports of materials other than pulp and paper. The net dollar exchange created in the years 1930 to 1939 was $1,635,790,000. This represented a sizable contribution by the paper market to the cause of world trade expansion.

"The weakening of the present tariffs on paper and paperboard would undoubtedly lead to large imports of these commodities, as has been demonstrated in the case of wood pulp and standard newsprint."

Since the bulk of the finished producing capacity in Holland, Germany and Russia has been destroyed, the only important sources will be in North America and an unprecedented demand for paper will center here. Besides Japanese war uses, consumption in Europe will rise rapidly as rehabilitation in damaged areas proceeds. On top of that will come an urgent call for paper from areas that have accumulated large cash balances, which so far they have been unable to spend. Among these are India, the Near and Middle East, Australia, Spain and South America.

Much of the increase in the Latin American demand is expected to hold into the postwar period because per capita income in those countries is not likely to recede to prewar levels. Their per capita consumption of finished paper in 1937 was only 13.7 pounds as contrasted with a North American figure of 241.9. Brazil and the Argentine have increased their paper producing capacity during the war but both are still far below domestic needs.

Present and Future Of British Paper Industry

Here are excerpts from a review of the paper industry in Great Britain during 1944 and expression of its fond hopes for the future, as published in The World's Paper Trade Review:

"While certain sections of the industry have suffered very much more than others, and while worth recognizing, indeed, that, owing to war demands, some sections of the industry are on by no means an unsatisfactory basis on the whole, the necessary (possibly some people might say, by the way, unnecessary) restrictions of the Control, and of export licensing, have undoubtedly affected the industry.

"Difficulties caused by shortage of coal from time to time, poor quality of coal, lack of transport and delay in transport, and, above all, the labor situation have greatly aggravated the already numerous cares of the mill manager and the executives of the industry as a whole.

"The bedrock of necessary production has been reached. There could be no possible further production without grave effects on the war effort and that standard of wellbeing which is regarded as the minimum for the country. In fact, such has been the position that we have arrived at a stage where is such a shortage of absolutely essential text books and other literature necessary for the country that there is only one direction in which there could possibly be any modification, and that modification must be upwards. That is the essential prerequisite for rehabilitation of the industry.

"There have been several very important orders which have had important effects on the industry, but there has been nothing of a revolutionary character.

Postwar Expansion

"The industry, like any other controlled industry, is impatient of control, but recognizes that there is no alternative at the present time.

"One feature which the industry does think should be stressed, and stressed to the utmost, is that there should be a wellnigh complete re-orientation of Control outlook. This is essential because the restrictive policy which has necessarily been pursued so far will have to be turned over to a policy of expansion, and expansion at a quick rate so that the industry can reach full rehabilitation at the earliest possible date.

"H.M. Government has seen fit to disclose in recent weeks certain figures of export during the war. These are simply appalling.

"We can fully understand that there have been immense difficulties in the way of export during the war; but the time has now come when, if this essential of British wellbeing is to be restored, something simply must be done to continue our contacts with out markets in the Empire and in other countries which have for many years relied upon British goods."

BRITISH EXPORTS OF PAPER AND PAPERBOARD

TO—	Quantity (Cwt.) 1942	1943	1944	Value 1942	1943	1944
Canada	13,744	7,169	6,077	$173,175	$113,089	$102,541
United States	30,202	25,678	27,544	387,483	324,267	337,664
Argentine	26,769	21,275	16,035	247,371	215,857	162,562
Total—All Countries	748,167	554,221	524,307	4,970,029	4,071,124	4,051,923

Source: British Board of Trade.

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UNITED STATES EXPORTS OF PULPWOOD, WOOD PULP, PAPER, PAPERBOARD AND CONVERTED PAPER PRODUCTS

Item	Unit of Measurement	1938	1939	1940	1941	1942	1943
Pulpwood	Cords	52,894	50,165	61,932	72,733	73,516	36,412
Sulphite wood pulp, bleached: rayon and special chemical grades	Tons	(a)	48,232	114,800	33,892	28,576	22,884
Sulphite wood pulp, bleached: other	Tons	(b) 90,262	23,243	102,415	77,241	78,431	44,991
Sulphite wood pulp, unbleached	Tons	33,976	40,915	72,290	77,572	98,406	89,691
Soda wood pulp	Tons	2,729	4,013	10,006	2,174	3,278	5,341
Sulphate wood pulp, unbleached	Tons	(c)	14,816	158,822	118,226	140,289	120,552
Sulphate wood pulp, bleached	Tons	(d)	(d)	18,205	10,474	28,156	16,344
Screenings and other wood pulp	Tons	(e) 13,517	(f) 8,285	4,400	6,656	1,012	897
Rags for paper stock: Valued $50 or over per ton	Tons	6,869	6,549	6,219	2,919	2,500	1,639
Rags for paper stock: Valued under $50 per ton	Tons	4,053	4,421	7,264	7,559	3,988	1,234
Other paper stock	1,000 lbs.	58,233	102,891	150,691	75,687	72,804	35,374
Newsprint paper	1,000 lbs.	11,291	26,991	87,833	140,530	83,190	70,512
Book paper, not coated	1,000 lbs.	18,352	30,773	85,292	82,811	42,877	44,829
Cover paper	1,000 lbs.	1,803	1,665	1,973	2,530	2,329	2,607
Greaseproof and waterproof paper	1,000 lbs.	7,840	9,240	18,357	19,492	30,350	34,747
Overissue and old newspapers	1,000 lbs.	142,969	171,270	219,382	182,113	10,040	11,084
Wrapping paper, except kraft	1,000 lbs.	30,189	35,216	84,101	88,274	29,779	25,255
Kraft wrapping paper	1,000 lbs.	14,343	19,227	86,394	51,688	26,226	30,460
Surface-coated paper	1,000 lbs.	8,071	14,152	21,561	20,691	31,029	18,302
Cigarette paper, cigarette books, and book covers	1,000 lbs.	(g)	(g)	(g)	(h) 1,130	12,925	14,099
Other tissue and crepe paper	1,000 lbs.	(i) 11,365	(i) 12,894	(i) 25,640	(j) 28,420	16,269	23,551
Toilet paper	1,000 lbs.	10,193	10,536	15,124	17,398	9,378	19,188
Paper towels and napkins	1,000 lbs.	4,098	5,960	5,723	6,052	4,603	3,680
Kraft container board	1,000 lbs.	(a)	85,484	202,152	69,196	86,129	46,091
Other boxboard	1,000 lbs.	83,221	28,111	101,703	58,621	32,613	29,303
Bristols and bristolboard	1,000 lbs.	2,605	2,592	4,250	5,106	5,366	7,731
Other paperboard	1,000 lbs.	(k) 39,328	32,948	110,059	83,520	49,168	51,022
Sheathing and building paper	1,000 lbs.	15,035	13,556	12,031	20,250	14,230	16,016
Fiber insulation board	1,000 sq. ft.	45,143	44,909	35,884	33,443	22,433	15,693
Wallboard of paper or pulp	1,000 sq. ft.	12,801	26,057	48,116	45,734	29,721	8,658
Blotting paper	1,000 lbs.	2,068	3,128	3,404	4,001	3,072	2,126
Filing folders, index cards, and other office forms	1,000 lbs.	1,130	1,221	1,266	1,575	1,835	2,656
Papeteries	1,000 lbs.	269	281	412	377	137	95
Writing paper	1,000 lbs.	27,308	37,972	99,218	84,093	55,237	91,373
Paper hangings (wallpaper)	1,000 rolls	1,427	1,284	1,198	1,403	841	597
Paper bags: heavy shipping sack-type	1,000 lbs.	(a)	5,218	10,154	8,742	9,173	10,648
Paper bags: other	1,000 lbs.	(l) 14,861	13,125	13,917	12,517	8,826	8,886
Boxes and cartons: heavy fiber shipping containers	1,000 lbs.	(a)	10,807	14,896	18,647	47,178	18,472
Boxes and cartons: other	1,000 lbs.	(m) 14,970	8,565	5,904	6,470	9,279	14,834
Envelopes	1,000 lbs.	961	1,079	1,360	1,459	854	1,140
Vulcanized fiber sheets, strips, rods, and tubes	1,000 lbs.	3,791	4,793	4,609	6,057	8,552	9,677
Cash-register and adding-machine paper	1,000 lbs.	4,611	5,509	5,254	1,659	3,155	3,033
Other paper and paper products	1,000 dollars	3,588	4,473	5,101	6,316	5,432	5,107

(a) Not shown separately until 1939.
(b) Includes rayon and special chemical grades.
(c) Included under "other wood pulp" prior to 1939.
(d) Included under "other wood pulp" prior to 1940.
(e) Includes bleached and unbleached sulphate pulp.
(f) Includes bleached sulphate pulp.
(g) Not shown separately until Nov. 11, 1941.
(h) Figures for Nov. 11-Dec. 31, 1941, incl.
(i) Includes cigarette paper.
(j) Incl. cigarette paper, Jan. 1-Nov. 10, 1941, incl.
(k) Includes kraft container board.
(l) Includes heavy shipping sack-type bags.
(m) Includes heavy fiber shipping containers.

Source: Foreign Commerce and Navigation of the United States; Bureau of the Census, United States Department of Commerce.

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(c) Included under "other wood pulp" prior to 1939. (b) Figures for Nov. [illegible]
(d) Included under "other wood pulp" prior to 1940. (1) Includes cigarette paper.
(e) Includes bleached and unbleached sulphate pulp. (m) Includes heavy fiber shipping containers.
Source: Foreign Commerce and Navigation of the United States; Bureau of the Census, United States Department of Commerce.

PACIFIC COAST PULP INDUSTRY--- More is Made, More Taken for Guns

Total Pacific Coast pulp production in 1944 was 1,979,450 tons as compared with 1,942,358 tons in 1943. Thus, the 1944 production for the entire Coast, including British Columbia, again was less than in 1940, 1941 and 1942, when 2¼ to 2½ million tons were made.

For Washington, Oregon and California, pulp production totaled 1,644,531 tons, an increase of 123,000 tons over 1943. The increase was almost entirely in Washington state — in fact that state's increase was more than 103,000 tons over the 1943 production and it was due principally to reopening of the kraft pulp mill of St. Regis Paper Co. at Tacoma in the spring of 1944 and the earlier reopening of the Scott Paper Co.'s subsidiary mill at Anacortes.

There was some increase in Oregon and a slight decline in the important British Columbia pulp industry.

The Pacific states pulpwood inventories at the end of 1944 totaled 309,677,000 feet (about 516,000 cords), averaging about 2½ months supply. It was less on the Columbia and Willamette—more on Puget Sound. And this critical situation deteriorated steadily since then, owing to shortages of manpower, equipment, etc.

Normally one-quarter of the market pulp for North American paper mills comes from the Pacific Coast pulp industry but the customers of these mills have had to surrender a big proportion of their supplies during the war years to the smokeless powder arsenals.

How much is a military secret. But it can be stated that in 1945 about four times as much smokeless powder was being made from wood pulp as in 1942. Eighty-five per cent of this was coming from Pacific Coast mills and the remainder from kraft pulp mills in Louisiana.

The Office of the Chief of Ordnance, War Department, Washington, D. C., authorized the disclosure that the Soundview Pulp Co. of Everett, Wash., the Longview, Wash., pulp mill of Weyerhaeuser Timber Co., and the Hoquiam, Wash., mill of Rayonier Incorporated, as well as International Paper Co. and Gaylord Container Corp. in Louisiana were

PACIFIC COAST MILL CAPACITIES

(In Tons Per Day)

(These are capacities reported to PULP & PAPER INDUSTRY by United States (Pacific Coast) and British Columbia mills as of May 1 of each year. The table also shows increases and decreases from previous years.)

	1941	1942	1943	1944	1945
Unbl. Sulphite	1908	2163(+255)	2178(+ 15)	2228(+ 50)	2437(+209)
Bl. Sulphite	2290	2240(+150)	2340(—100)	2360(+ 20)	2468(+108)
Sulphate	1380	1560(+180)	1600(+ 40)	1600	1540(— 60)
Groundwood	2235	2291(+ 56)	2251(— 40)	2275(+ 24)	2190(— 85)
Soda	65	65	65	75(+ 10)	75
Total Pulp	7878	8519(+641)	8434(— 85)	8538(+104)	8710(+172)
Paper—					
Sulphite	963	1024(+ 61)	922(—102)	922	959(+ 37)
Sulphate	830	850(+ 20)	865(+ 15)	865	865
Newsprint	1805	1756(— 49)	1753(— 3)	1753	1925(+172)
Paperboard	1468	1468	1483(+ 15)	1503(+ 20)	1582(+ 79)
Book Paper	105	95(— 10)	95	105(+ 10)	53(— 52)
Others	705	804(+ 99)	923(+ 94)	911(— 12)	1088(+177)
Total Paper	5876	5997(+121)	6041(+ 44)	6059(+ 18)	6472(+413)

U. S. PACIFIC COAST WOOD PULP PRODUCTION, 1923-1944

Tons of 2,000 lbs.

1923	299,596	1930	815,089	1937	1,523,192
1924	309,433	1931	817,548	1938	1,087,747
1925	322,594	1932	607,662	1939	1,384,147
1926	378,005	1933	773,102	1940	1,839,263
1927	449,218	1934	935,033	1941	1,994,150
1928	562,514	1935	1,011,421	1942	1,968,658
1929	780,494	1936	1,198,431	1943	1,521,531
				1944	1,644,531

—Source, U. S. Pulp Producers Assn.

PACIFIC COAST PULP PRODUCTION — 1930-1944

Pacific Coast States and British Columbia
(Tons of 2,000 lbs.)

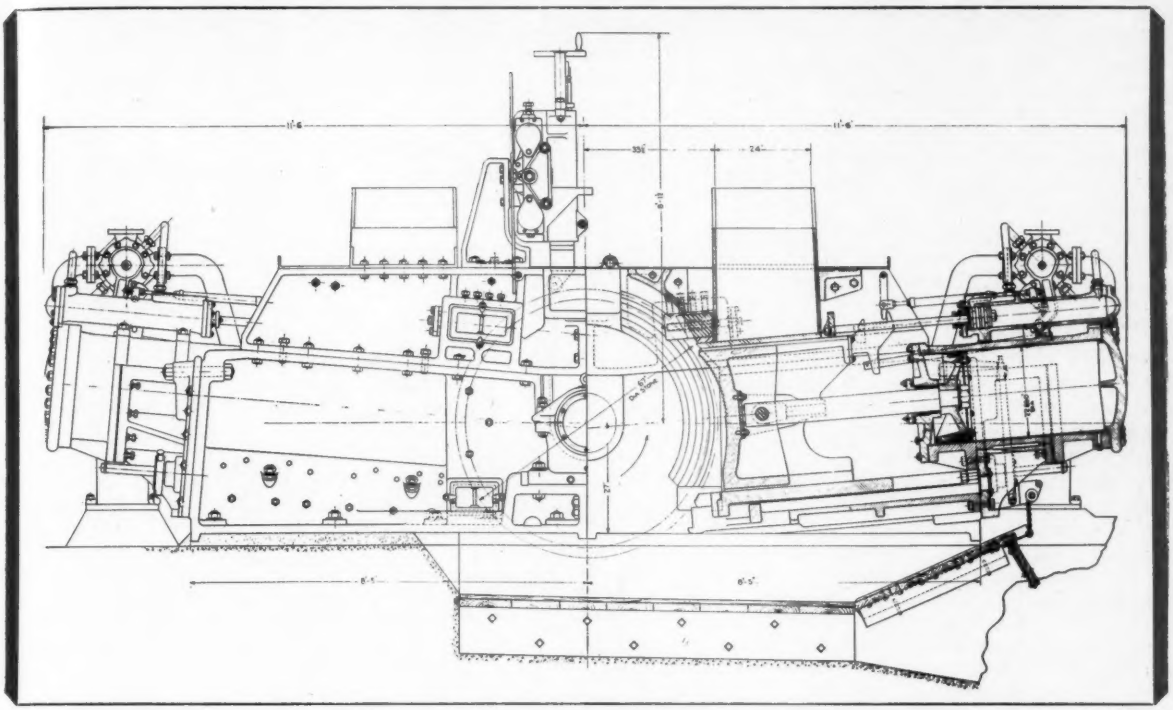
	1930 Tons	1931 Tons	1932 Tons	1933 Tons	1934 Tons	1935 Tons	1936 Tons
Washington	566,137	580,016	420,529	583,770	709,380	775,722	895,797
Oregon and California	248,952	237,532	187,133	189,332	240,167	262,221	302,634
British Columbia	335,429	310,029	259,586	343,897	383,818	377,522	416,433
Total Pacific Coast	**1,150,518**	**1,127,577**	**867,248**	**1,117,999**	**1,333,365**	**1,415,465**	**1,614,864**

	1937 Tons	1938 Tons	1939 Tons	1940 Tons	1941‡ Tons	1942* Tons	1943* Tons	1944* Tons
Washington	1,184,390	836,959	1,107,318	1,443,121	1,475,671	1,572,841	1,153,177	1,256,374
Oregon and California	338,802	250,788	270,829	396,142	518,479	421,154	403,306	412,342
British Columbia	425,558	242,020	321,132	445,564	494,811	448,272	385,875	465,787
Total Pacific Coast	**1,948,750**	**1,329,767**	**1,699,279**	**2,284,827**	**2,488,861**	**2,442,267**	**1,942,358**	**2,134,503**

Source—U. S. figures up to and including 1940, from U. S. Dept. of Commerce, Bureau of Census; B. C. figures from Dept. of Lands, Forest Branch; and Dominion Bureau of Statistics.

‡ Figures based upon United States Pulp Producers Association total for Oregon and Washington. Division of production between Oregon and Washington estimated by Pacific Pulp & Paper Industry. No wood pulp production in California.

*U. S. figures from War Production Board.



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on this nitrating pulp program. Also the Chief of Ordnance disclosed that in July of this year the Everett mill of Weyerhaeuser Timber would also be producing nitrating pulp and by fall the Rayonier mill at Shelton, Wash., would be reopened for the same purposes. In Canada, British Columbia Pulp & Paper Co. was making similar pulp.

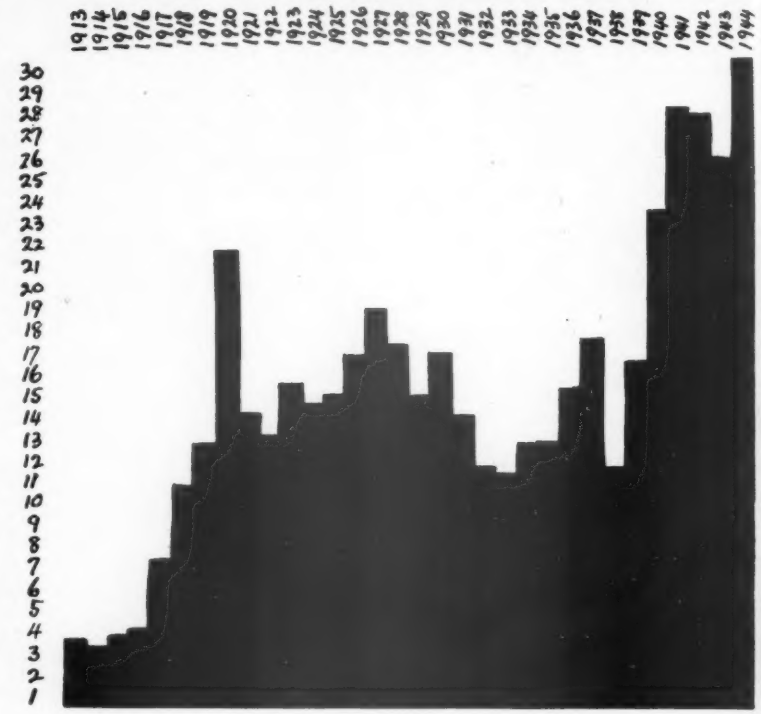
All of the medium and heavy guns of the U. S. Army were being fired by smokeless powder from wood pulp and the British Navy likewise was using a wood pulp base explosive.

This diversion of huge amounts of high grade pulp to direct war purposes was having a fundamental effect upon the market supply for paper mills as well as the quality of paper production.

With the sea lanes already open for resumption of Swedish pulp shipments to the U. S., it raised some rather delicate points. But the west coast mills and their management were not complaining because of the competitive handicaps thus placed upon them. They were close enough to the Pacific War to be more than willing to get out every pound of pulp they could to hasten V-J Day.

VALUE OF BRITISH COLUMBIA PULP AND PAPER PRODUCTION OVER 32 YEARS

(Figures in left hand column are millions of dollars.)



BRITISH COLUMBIA PULP AND PAPER AND ALL FOREST PRODUCTS ESTIMATED VALUE OF PRODUCTION

Including Loading and Freight Within the Province

	1938	1939	1940	1941	1942	1943	10-Year Av.
Pulp and Paper	$11,066,000	$16,191,000	$22,971,000	$27,723,000	$27,457,000	$25,597,000	$18,675,000
All Forest Products	67,122,000	88,221,000	102,804,000	119,920,000	124,720,000	124,720,000	86,786,000

BRITISH COLUMBIA

Review of Pulp and Paper Production

1919 - 1944

	—PULP—			—PAPER—	
	Sulphite	Sulphate	Tons Groundwd	Newsprint	Other
1944	———	———	———	236,696	74,038
1943	———	———	———	211,696	63,026
1942	———	———	———	252,559	74,915
1941	———	———	———	275,788	75,453
1940	———	———	———	262,144	68,428
1939	———	———	———	216,342	50,870
1938	———	———	———	179,639	39,348
1937	———	———	———	264,136	53,026
1936	———	———	———	276,710	41,443
1935	———	———	———	262,123	33,287
1934	130,176	15,630	209,359	267,406	26,777
1933	122,265	15,715	185,451	237,107	23,492
1932	85,419	10,889	161,502	205,050	24,051
1931	124,521	11,744	170,432	217,562	17,709
1930	130,462	13,055	172,539	224,928	20,446
1929	112,925	15,647	151,066	201,009	19,492
1928	120,413	15,050	170,005	225,477	15,960
1927	119,005	13,700	163,548	214,010	13,745
1926	108,381	15,000	136,123	176,924	10,389
1925	92,514	16,856	121,363	148,201	9,261
1924	89,839	14,405	112,001	136,281	9,653
1923	99,878	9,932	107,266	142,928	7,709
1919	80,347	9,473	99,769	123,607	7,202
1922	86,894	9,674	100,759	124,639	7,945
1921	68,502	6,519	89,725	110,176	6,934
1920	92,299	16,380	108,655	136,832	9,792

	Total Production All Grades—Tons Pulp	Paper	Estimated value of production:
1944	465,787	310,734	$30,391,000
1943	385,875	274,722	25,597,000
1942	448,272	327,474	27,457,000
1941	494,811	351,453	27,723,000
1940	438,500	330,572	22,971,000
1939	321,132	272,117	16,191,000
1938	242,020	222,305	11,066,000
1937	425,558	320,920	17,214,000
1936	416,433	320,555	19,012,369
1935	377,522	299,816	10,708,145
1934	383,818	299,502	10,347,123
1933	323,431	260,599	10,852,000
1932	259,586	228,075	11,156,000
1931	310,029	244,397	13,508,000
1930	316,056	245,374	16,520,000
1929	279,638	220,501	14,400,000
1928	305,468	241,437	16,755,000
1927	296,253	227,755	18,505,000
1926	259,504	187,313	16,315,000
1925	230,733	157,462	14,466,000
1924	216,243	145,934	13,938,000
1923	217,076	150,637	15,018,000
1922	197,327	132,584	12,590,000
1921	164,746	117,110	13,500,000
1920	217,334	146,624	———
1919	189,589	130,809	———

Source—British Columbia, Department of Lands, Report of the Forest Branch.

Pulp Industry Of Northern Europe

Tables on pages 121-122-123 deal with world commerce in wood pulp in the years before the war with particular attention given to the pulp imports and exports in European countries, especially Scandinavia.

A study of these tables are of value in calculating what might be expected when normal conditions are resumed. However, there are many other factors to be considered—war damage, trend toward conversion of pulp in countries where it is produced, currency exchange values, etc.

The Housley report published in the January PULP & PAPER INDUSTRY forecast pulp imports by U. S. mills in 1947, at 1,500,000 tons, including 500,000 tons from Europe and the remainder from Canada and Newfoundland. Europe's total production for the year was forecast at 10,800,000 tons as compared with the high record of 13,588,000 tons in 1937 and an estimated 12,214,000 tons in 1939. (See page 139).

The Neubrech report (Dept. of Commerce), published in our February issue, was less omptimistic, predicting European production of only 8,808,000 tons in 1947 and 10,408,000 tons in the third year after V-E Day.

Sweden

Swedish shipments of pulp will soon be coming into the U. S. and, in view of a large stockpile, they should be considerable at least, although large shipments have been contracted for in England.

Some valuable information on the status of the European industries is given in the February PULP & PAPER INDUSTRY—the first disclosure of much data that has been held in secrecy by the government since the war began.

Sweden's pulp and paper industry is not only intact, but much improved. Facilities for producing higher grade pulp have been increased. On the other hand, much Swedish timber is expected to go into lumber for Europe and there are indications that the Swedes will use more pulp to make paper and rayon.

Norway

Advices through government channels indicate that prospects of wood pulp supplies from Norway are highly dubious. Indications are that patriots carried on a sabotage that reduced to one-half the cut expected by the Nazis. The Germans had demanded an increase to twice the pre-war production, and this had led to speculation that amounts would be available for export after V-E Day.

Another story coming through Department of Commerce channels is that Norwegian refugees in Sweden have established forestry schools and nurseries, will transport seedlings to Norway and hope to rehabilitate the forests in 20 years.

Russia

Russia has taken over, or will control, much of the remainder of the pulp industry of North Europe, especially mills in Finland, Latvia, Memel, etc. They represent considerable tonnage and the big question mark is going to be Russia's policy.

If Russia embarks on a policy of raising the standards of its own people, it is conceivable that much of this pulp will go into paper, paper products and rayon. One U. S. government official in contact with the Russians contends that the Soviet government is not going to ship any more of its production out of the country than is necessary to pay its import bills. These bills, however, can be considerable—for instance, a $6,000,000,000 credit with U. S. over 30 years. Russia may decide to pay off by shipping pulp and pulpwood overseas.

Finland

The Finnish reparations to Russia amounting to $300,000,000, payable in goods over a period of 6 years, include 125 million dollars worth of forest products and pulps, according to British press reports. The other 175 million dollars are to be paid in ships, machines and other equipment.

The province of Karelia, ceded to Russia, produces about 275,000 tons of sulphite pulp and about 130,000 tons of kraft, which is more than 25% of Finland's total chemical pulp output. There are five large sulphite mills and two large kraft mills in Karelia and much of Finland's forest resources.

Particulars relating to the Finnish wood pulp and paper outlook for 1945 can be summarized under two broad headings, states a report issued by the U. S. Department of Commerce based on information it has received from Finland. The first, delivery of forest products to the Soviet Union as part of the reparations payments, presents no particular problem inasmuch as the quantities and qualities already agreed upon are to a large extent within the capacity of the industry. The second, provision for exports of wood pulp and paper to other markets in order to obtain materials essential to Finland's national economy, is somewhat more complicated since the industry does not have on hand adequate raw materials.

WOOD PULP: EXPORTS FROM FINLAND, NORWAY AND SWEDEN, 1935 AND 1937

(Tons of 2,000 Lbs.)

DESTINATION	FINLAND				NORWAY				SWEDEN			
	1935		1937		1935		1937		1935		1937	
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%
UNITED STATES	287,069	21.5	288,926	17.8	94,232	16.6	92,400	12.8	895,285	38.6	1,084,634	38.6
SOUTH AMERICA a/	16,505	1.2	56,743	3.5	6,674	1.2	20,667	2.8	58,981	2.5	93,325	3.3
JAPAN	32,043	2.4	41,445	2.6	48,738	8.6	57,626	8.0	55,022	2.4	123,068	4.4
EUROPEAN COUNTRIES	999,193	74.7	1,218,432	75.2	406,952	71.7	544,622	75.3	1,228,640	53.0	1,410,845	50.1
Great Britain	657,015	49.1	819,972	50.6	289,642	51.0	351,902	48.6	537,772	23.2	650,242	23.1
France	105,679	7.9	181,779	11.2	32,646	5.8	87,265	12.1	234,826	10.1	271,057	9.6
Germany	39,575	3.0	42,739	2.6	14,149	2.5	12,385	1.7	58,049	2.5	107,188	3.8
Belgium	30,973	2.3	30,778	1.9	22,878	4.0	32,171	4.5	73,846	3.2	86,656	3.1
Italy	52,170	3.9	56,163	3.5	8,062	1.4	12,774	1.8	113,037	4.9	106,785	3.8
Spain	17,968	1.4	9,168	0.6	9,343	1.6	2,039	0.3	93,442	4.0	26,213	0.9
Netherlands	13,728	1.0	30,632	1.9	20,157	3.6	27,071	3.7	44,048	1.9	65,143	2.3
All Other European Countries	82,085	6.1	47,201	2.9	10,075	1.8	19,015	2.6	73,620	3.2	97,561	3.5
ALL OTHER COUNTRIES	3,071	0.2	14,750	0.9	11,168	1.9	8,201	1.1	80,120	3.5	101,744	3.6
TOTAL	1,337,881	100.0	1,620,296	100.0	567,764	100.0	723,516	100.0	2,318,048	100.0	2,813,616	100.0

a/ Includes all American countries except United States.

SOURCE: WORLD WOOD PULP STATISTICS
UNITED STATES PULP PRODUCER'S ASSOCIATION, 1937 and 1938.

PEACE IN EUROPE HAS BROUGHT AN ACCELERATION OF INTERNATIONAL TRADE IN PULP. FOLLOWING TABLES SHOW HOW THIS TRADE OPERATED IN YEARS BEFORE THE WAR

WOOD PULP: Exports by Principal European Countries, 1935 and 1937

(Tons of 2,000 pounds)

Country	1935 Total Exports	1935 Exports to non-European Countries	1935 Exports to European Countries	1935 Exports to non-specified Countries	1937 Total Exports	1937 Exports to non-European Countries	1937 Exports to European Countries	1937 Exports to non-specified Countries
Exports from:								
Sweden	2,318,048	1,089,385	1,228,640	23	2,813,616	1,402,771	1,410,845	---
Finland	1,337,881	338,688	999,193	---	1,620,296	401,864	1,218,432	---
Norway	567,764	160,812	406,952	---	723,516	178,894	544,622	---
Austria	170,674	1,583	164,076	5,015	205,296	16,004	189,292	---
Germany	326,570	114,974	205,048	6,548	183,256	85,756	95,424	2,076
Czechoslovakia	100,839	37,320	61,720	1,799	149,767	54,181	95,586	---
Estonia	87,689	14,676	69,302	3,711	75,724	19,642	55,265	817
Lithuania	57,528	13,280	44,113	135	75,641	20,235	54,520	886
Belgium	19,607	---	19,489	118	26,300	---	25,739	561
Yugoslavia	11	---	11	---	9,000	---	9,000	---
Latvia	2,935	1,171	1,764	---	8,551	3,931	4,620	---
Rumania	9,340	---	---	9,340	8,000	---	---	8,000
Great Britain	4,032	---	---	4,032	8,000	---	---	8,000
Switzerland	2,917	---	---	2,917	7,881	---	---	7,881
France	2,725	---	---	2,725	4,381	---	---	4,381
Poland	4,363	---	---	4,363	2,735	2,735	---	---
Netherlands	2,489	---	2,489	---	2,125	---	2,125	---
TOTAL	5,015,412	1,771,889	3,202,797	40,726	5,924,085	2,186,013	3,705,470	32,602

Source: World Wood Pulp Statistics, United States Pulp Producer's Association, 1937 and 1938.

WOOD PULP: Imports by Principal European Countries, 1935 and 1937.

(Tons of 2,000 pounds)

Country	1935 Total Imports	1935 Imports from non-European Countries	1935 Imports from European Countries	1935 Imports from non-specified Countries	1937 Total Imports	1937 Imports from non-European Countries	1937 Imports from European Countries	1937 Imports from non-specified Countries
Imported into:								
Great Britain	1,611,992	26,465	1,566,739	18,788	2,011,042	24,351	1,856,870	129,821
France	535,938	14,926	513,161	7,851	730,387	16,704	710,487	3,196
Italy	370,286	---	276,003	94,283	276,324	5,985	266,312	4,027
Germany	158,149	693	155,821	1,635	203,219	855	202,202	162
Belgium	170,678	11,020	155,381	4,277	191,895	12,869	165,252	13,774
Netherlands	126,711	6,050	117,448	3,213	122,751	1,302	118,833	2,616
Denmark	46,647	---	39,689	6,958	54,650	---	45,159	9,491
Hungary	28,951	---	---	28,951	46,385	---	---	46,385
Spain	137,988	---	133,771	4,217	40,000	---	40,000	---
Greece	14,325	---	14,270	55	26,523	---	26,413	110
Poland	9,686	---	9,686	---	25,814	---	25,814	---
Switzerland	18,643	---	---	18,643	23,095	---	---	23,095
Yugoslavia	16,808	---	16,808	---	24,000	---	24,000	---
Norway	25,650	---	---	25,650	20,625	---	---	20,625
Sweden	6,251	---	---	6,251	12,477	---	---	12,477
Bulgaria	7,429	---	7,038	391	11,956	---	11,738	218
Czechoslovakia	5,280	---	---	5,280	9,883	---	---	9,883
Austria	9,526	---	9,526	---	4,470	---	4,470	---
Turkey	---	---	---	---	5,126	---	3,638	1,488
Estonia	3,313	---	---	3,313	3,302	---	---	3,302
U.S.S.R.(Russia)	5,348	---	---	5,348	---	---	---	---
Rumania	1,525	---	---	1,525	---	---	---	---
Latvia	1,215	---	---	1,215	997	---	---	997
Lithuania	1,213	---	---	1,213	1,290	---	---	1,290
TOTAL	3,313,552	59,154	3,015,341	239,057	3,846,211	62,066	3,501,188	282,957

Source. United States Pulp Producer's Association, World Wood Pulp Statistics, 1937 and 1938.

WOOD PULP: United States Imports, by Country and Grade, 1935-39

(Tons of 2,000 pounds)

Year	Total Imports	Sweden	Finland	Norway	Germany	Other European	Newfoundland and Canada
Total All Grades:							
1935	1,933,249	898,877	266,492	93,308	80,255	53,239	541,078
1936	2,277,500	1,014,809	311,009	125,256	74,663	80,801	670,962
1937	2,394,605	1,130,075	285,994	102,978	69,060	94,260	712,238
1938	1,710,393	807,129	258,908	70,365	37,968	68,700	467,323
1939	2,026,441	873,359	336,618	95,604	21,142	61,765	637,953
Bleached Sulphite:							
1935	429,424	69,237	29,550	52,407	30,231	22,226	225,773
1936	512,168	67,309	31,131	70,950	34,792	26,924	281,062
1937	511,961	62,100	47,433	55,614	35,996	24,314	286,504
1938	337,659	44,822	53,201	52,589	5,051	14,972	167,024
1939	474,109	64,855	70,611	65,516	8,702	12,011	252,414
Unbleached Sulphite.							
1935	693,026	377,320	146,166	16,539	50,024	27,948	75,029
1936	786,720	425,753	157,324	25,391	39,871	50,109	88,272
1937	919,680	539,488	123,112	28,479	32,740	67,326	128,535
1938	686,252	392,211	117,167	4,892	32,917	52,560	86,505
1939	661,193	374,003	115,844	14,145	12,440	34,617	110,144
Unbleached Sulphate:							
1935	526,684	400,654	62,173	17,328	---	2,980	43,549
1936	635,722	457,912	87,415	23,324	---	3,768	63,303
1937	622,390	454,049	88,764	17,798	324	2,614	58,841
1938	427,765	297,305	69,051	12,060	---	1,168	48,181
1939	546,167	335,550	121,819	15,545	---	15,137	58,116
All Other Grades:							
1935	284,115	51,666	28,603	7,034	---	85	196,727
1936	342,890	63,835	35,139	5,591	---	---	238,325
1937	340,574	74,438	26,685	1,087	---	6	238,358
1938	258,717	72,791	19,489	824	---	---	165,613
1939	344,972	98,951	28,344	398	---	---	217,279

Source: United States Bureau of Foreign & Domestic Commerce presented in Wood Pulp Statistics, United States Pulp Producers Association, July 1944, pp. 44 and 45.

WOOD PULP: United States Exports to Principal Countries, 1935-39

(Tons of 2,000 pounds)

Year	Total Exports	Belgium	France	United Kingdom	Other European	Canada	Japan	All Other Countries
1935	171,710	7,153	7,238	2,877	a/	2,597	135,686	16,159
1936	193,485	8,151	5,442	4,337	1,023	1,490	164,705	8,337
1937	322,544	14,185	17,415	30,793	3,950	23,798	215,681	16,722
1938	140,484	5,197	5,026	31,657	4,488	17,450	61,533	15,133
1939	139,504	8,459	8,504	32,587	1,629	21,315	31,251	35,759

a/ Included in "All Other Countries"

Source: United States Bureau of Foreign and Domestic Commerce presented in Wood Pulp Statistics, United States Pulp Producer's Association, July 1944, pp. 67.

FINANCIAL SURVEY--The Industry Is In Note of Confident Optimism Pervades

A note of confident optimism pervades the great majority of the annual reports of units of the U. S. and Canadian industry, not only as to the figures themselves but in the messages to stockholders from the heads of companies.

A typical stressing of postwar sales volume and lower unit costs is reflected in the message to stockholders of John H. Smith, president of the Hawley Pulp & Paper Co., who said: "One of our main aims has been to build a firm foundation for postwar sales volume. Another objective is lower unit costs, and the outlook for the present year is most favorable."

Examples of corporate simplification, financial rehabilitation, product improvement, diversification and new product research, are all manifest in the annual report of the St. Regis Paper Co. Said R. K. Ferguson, president, in his annual message: "Our program begun ten years ago has accomplished a large expansion in tonnage and dollar volume. An important point has been reached in the production of wood cellulose products, placing the company in an advantageous position toward continued development in the postwar period." Mr. Ferguson also invited attention to the company's entry into rayon manufacturing, bleached groundwood papers, and to the widening use of paper shipping sacks. He also pointed to St. Regis' new place in the laminated plastics industry.

Practically all annual reports reflected the contribution of the industry to the war. Typical is this message from International Paper Co., signed by Richard J. Cullen chairman, and John H. Hinman president:

"Your company is proud of its wartime achievements. It has supplied, in record amounts, the raw materials out of which countless millions of containers have been manufactured, by its own plants and others, to carry munitions and supplies of every character to every battlefront under every condition of temperature and weather. It has supplied great quantities of kraft paper and board for use on the homefront, frequently supplying new and

COMPARATIVE OPERATING RESULTS AND PER SHARE STATISTICS

(Sales, Profits and Income in Thousands of Dollars)

	Net Sales	*Pre-Tax Profits	*Net Income	† Per Common Share ‡Earned	oDividends	oPrice Range
b-American Writing Paper Co. (Dec. 31):						
1939	$ 6,784	$ 286	$ 239	$0.67	Nil	2½-1¼
1941	8,713	195	137	0.32	Nil	3⅛-2¼
1943	9,355	821	245	0.65	Nil	5⅜-2½
1944	9,122	568	184	0.51	Nil	7¼-4⅛
b-Brown Co. (Nov. 30):						
1941	32,198	5,177	3,727	c25.79	Nil	c31½-25
1943	30,998	2,501	1,126	c 7.80	Nil	c36 -28¼
1944	32,329	2,513	1,298	c 8.99	Nil	c37 -31½
Champion Paper & Fibre Co. (a-April 30):						
1937	22,415	1,851	1,557	1.98	$2.25	63¼-25⅛
1939	23,406	1,638	1,330	1.51	0.10	30 -17
1941	42,258	7,833	3,130	4.71	1.00	22⅞-14¾
1943	46,249	7,099	1,971	2.57	1.00	24 -18
e-1944	N.A.	5,758	1,502	1.77	1.00	31¼-23
Consolidated Paper Co. (Dec. 31):						
1937	12,815	1,614	1,302	1.74	2.00	22 -14
1939	9,786	1,136	933	1.24	1.00	17 -13
1941	15,367	2,905	1,449	1.93	1.25	16¼-15
1943	17,976	3,106	1,222	1.63	1.00	15¾-12
1944	18,323	2,796	1,072	1.43	1.50	17½-14⅞
Container Corp. of America (Dec. 31):						
1937	25,268	2,312	1,784	2.28	1.20	37⅜-10¾
1939	24,115	1,742	1,449	1.85	0.25	17¼- 9⅛
1941	46,714	6,742	2,327	2.98	1.50	16½-11
1943	61,164	10,384	2,684	3.45	1.50	23¾-16
1944	69,641	11,113	2,663	3.41	1.50	29⅜-20
Crown Zellerbach Corp. (a-April 30):						
1937	49,891	7,488	6,211	1.58	0.25	25¼- 8½
1939	56,527	10,324	8,119	2.42	0.50	17⅜- 9
1941	86,336	20,103	11,109	3.74	1.00	15⅜-10
1943	97,834	15,432	7,603	2.19	1.00	17 -11½
f-1944	74,523	10,561	5,400	1.51	1.00	22½-15½
Eddy Paper Corp. (Dec. 31):						
1937	9,694	785	650	3.65	3.00	41¼-18½
1939	8,578	394	328	1.77	0.50	19¼-14⅛
1941	14,972	2,233	833	4.50	2.00	21 -13½
1943	14,369	3,008	768	4.68	3.50	28½-22
1944	16,020	3,924	1,059	6.44	4.50	38 -25
Gair (Robert) Co., Inc. (Dec. 31):						
1937	21,655	794	557	Nil	Nil	15⅜- 3
1939	14,735	d624	d634	**	Nil	5⅞- 2
1941	23,393	2,465	1,127	0.80	0.25	2¾- 1¼
1943	26,576	3,146	969	0.66	0.30	4⅛- 1⅜
1944	27,640	2,766	761	0.48	0.30	5¼- 2⅞
Gaylord Container Corp. (Dec. 31):						
1937	13,480	2,307	1,765	2.76	0.75	----
1939	13,660	809	662	0.71	0.70	18¾- 9⅜
1941	25,281	3,970	1,749	2.72	1.00	12½- 8⅜
1943	31,708	3,153	1,243	1.82	1.00	14¾- 9¾
1944	33,945	3,851	1,287	1.90	1.00	23½-13¼
Great Northern Paper Co. (Dec. 31):						
1937	N.A.	2,577	2,178	2.18	2.00	47 -27
1939	N.A.	3,296	2,727	2.73	2.40	45 -33
1941	N.A.	3,815	2,432	2.44	2.50	42 -29½
1943	N.A.	3,097	1,860	1.86	1.60	36 -27¼
1944	N.A.	2,775	1,667	1.67	1.60	37½-29¼
Hammermill Paper Co. (Dec. 31):						
1937	7,443	580	450	1.25	3.00	N. A.
1939	7,330	623	463	1.83	0.50	28½-18
1941	10,703	1,351	671	3.11	1.25	25¼-15¾
1943	11,424	1,663	585	2.64	1.00	25 -17½
1944	12,570	1,591	454	1.92	1.00	29 -19⅜
Hinde & Dauch Paper Co. (Decc. 31):						
1937	15,827	1,778	1,428	3.61	2.00	37 -16⅛
1939	13,845	1,091	912	2.04	1.00	19 -14¾
1941	22,490	3,346	1,446	3.42	1.50	16½-12½
1943	24,848	3,574	1,197	2.83	1.50	21¾-14½
1944	24,357	3,368	1,148	2.69	1.50	25½-19¾

(Table continues on next page)

Splendid Position for Any Eventuality
desreat Majority of Company Statements

better substitutes for scarce or non-existant wartime materials. With its subsidiaries it has produced more multi-wall paper bags, the largest tonnage of dissolving pulp and (due to its production of wartime V-boxes) more containers, than ever before in its history."

Some companies strengthened themselves greatly in financial position along with raw supplies insurance for the future, notably Rayonier Incorporated, which showed a payment of $500,000 more against bank loans, bringing their obligation down to 2½ million as of January 31—and reported the arranging of financing for the purchase of Clallam County (Washington) timber lands and logging equipment from Bloedel, Donovan Lumber Mills, and plans to reopen the Shelton (Wash.) mill, "assuring American independence of dissolving pulp imports from abroad." Significantly, Rayonier's net income for the third quarter of the fiscal year was $519,984, equal to about 21c a common share. This against $338,811 for the like period of the preceding fiscal year, equal to less than 3c a common share.

The broadness and seriousness with which the industry is entering the plastics field was typified in the report of the Hummell-Ross Fibre Corp. of Hopewell, Va., which stated in its annual report that "realizing many possibilities for our products in the plastic field after the war, we have set up a research laboratory and have developed many uses for plastic materials using our products as a base material."

Soundview Pulp Co.'s report is an outstanding example of those companies which have embraced new methods to make improvements in their set-up. Their report stressed the purchase of their new hydraulic log barker, and plans to install a whole log chipper, to save 20 per cent on waste wood.

How the exigencies of war hampered normal research just getting under way at the outbreak of hostilities is reflected in the report to stockholders of Joseph M. Conway, president of the Hoberg Paper Mills, Inc., and Mr. Conway is cautious in his prediction for 1945: "Any prediction . . . will depend primari-

COMPARATIVE OPERATING RESULTS AND PAPER SHARE STATISTICS (Continued)

(Sales, Profits and Income in Thousands of Dollars)

	Net Sales	*Pre-Tax Profits	*Net Income	† Per Common Share ‡Earned	oDividends	oPrice Range
International Paper Co. (Dec. 31):						
1937	123,487	11,780	9,135	2.47	Nil	19¼- 6¼
1939	122,290	5,709	4,894	0.14	Nil	14¾- 6⅜
1941	214,334	43,751	16,254	6.37	Nil	20 -10⅞
1943	216,123	32,451	10,120	3.01	Nil	14¾- 8¼
1944	231,572	35,833	10,560	3.26	Nil	21⅞-13⅛
Kimberly-Clark Corp. (Dec. 31):						
1937	27,250	3,124	2,360	$3.61	2.00	46¾-17¾
1939	27,861	3,561	2,651	4.21	1.75	38 -20
1941	36,959	5,818	3,104	5.13	2.25	38 -25
1943	57,488	6,694	2,550	4.00	1.75	34 -25
1944	61,331	6,125	2,422	3.09	2.00	42 -31½
Marathon Corp. (Oct. 31):						
1937	N.A.	1,087	857	2.06	g1.50	44 -17
1939	13,298	724	592	1.31	0.50	24½-16¼
1941	18,081	2,012	1,205	2.84	0.75	18 -12
1943	25,381	5,008	1,286	3.04	1.00	21¼-16½
1944	29,856	5,979	1,603	3.75	1.00	32¾-18½
Mead Corporation (Dec. 31):						
1937	25,373	2,278	1,841	2.40	1.50	34¾-10
1939	21,987	915	744	0.46	Nil	14⅜- 6
1941	32,452	3,761	2,110	2.66	0.75	9⅝- 5
1943	36,878	2,981	1,153	1.00	0.60	10¾- 6
1944	39,920	3,223	1,213	1.09	0.60	13 - 8
National Container Corp. (Dec. 31):						
1937	3,065	357	312	0.47	0.25	14⅜- 6½
1939	4,864	434	358	0.54	0.20	10⅜- 5
1941	9,207	2,729	1,073	1.63	0.62½	12⅞- 8⅜
1943	12,969	3,191	817	1.24	0.50	13½-10¾
1944	17,656	4,474	1,191	1.80	0.90	14½-10
Oxford Paper Co. (Dec. 31):						
1937	N.A.	934	800	0.75	Nil	20 - 7¾
1939	N.A.	825	674	0.42	Nil	8¾- 2
1941	N.A.	1,996	1,057	1.44	Nil	6⅜- 3½
1943	N.A.	2,169	914	1.07	Nil	3½- 1⅜
1944	N.A.	2,216	1,024	1.36	Nil	8¼- 3¾
Rayonier Incorporated (a-April 30):						
1937	17,496	3,746	3,125	1.94	N.A.	N.A.
1939	16,292	2,887	2,389	1.18	Nil	19 - 6⅜
1941	31,317	9,080	3,570	2.40	0.75	18½- 8¾
1943	22,824	2,489	1,689	0.45	0.87½	15½-11¼
1944	N.A.	3,004	1,420	0.50	Nil	18 -12¼
St. Regis Paper Co. (Dec. 31):						
1937	14,869	1,599	1,228	0.22	Nil	11¾- 2⅜
1939	15,359	705	548	0.06	Nil	4½- 1⅜
1941	30,000	5,247	3,228	0.71	Nil	2⅜- 1¼
1943	25,528	2,910	1,856	0.38	Nii	4¾- 1½
1944	48,388	5,398	1,854	0.36	Nil	6⅜- 4⅛
Scott Paper Co. (Dec. 31):						
1937	13,844	1,603	1,249	2.19	1.55	45¼-34½
1939	18,517	2,512	1,886	2.65	1.85	52⅛-44½
1941	27,076	3,277	1,940	2.52	1.95	39½-31
1943	30,570	2,692	1,535	1.91	1.80	43 -36¼
1944	31,467	2,972	1,566	1.96	1.80	45⅛-37½
Sutherland Paper Co. (Dec. 31):						
1937	8,137	997	805	2.80	1.80	39⅞-17½
1939	8,490	866	723	2.52	1.30	30½-22¾
1941	12,843	1,574	818	2.85	1.25	23¼-16⅛
1943	15,479	2,541	818	2.85	1.25	33 -26¼
1944	14,947	2,260	710	2.47	1.35	34 -29
Union Bag & Paper Corp. (Dec. 31):						
1937	15,691	1,675	1,385	1.32	0.50	18⅜- 8⅞
1939	17,562	1,134	966	0.76	Nil	13⅛- 6
1941	27,871	5,619	2,168	1.70	1.00	12¾- 7
1943	33,555	2,767	1,058	0.83	0.30	11¾- 8
1944	39,021	6,722	1,584	1.25	0.75	15½- 9¼

(Table continued on next page)

COMPARATIVE OPERATING RESULTS AND PAPER SHARE STATISTICS (Continued)

(Sales, Profits and Income in Thousands of Dollars)

	Net Sales	*Pre-Tax Profits	Net Income	† Per Common Share ‡Earned	oDividends	oPrice Range
West Virginia Pulp & Paper Co. (Oct. 31):						
1937	31,413	3,516	2,862	2.14	0.70	41 -15½
1939	29,760	1,240	1,095	0.18	0.20	19⅛- 9½
1941	47,521	6,820	4,520	3.97	1.80	20⅞-15
1943	53,715	7,662	2,610	1.86	1.25	16¾-11¾
1944	59,098	6,484	2,384	1.80	1.00	28 -16½
Columbia River Paper Mills (Dec. 31):						
1937	N.A.	62	47	1.05	N.A.	N.A.
1939	N.A.	N.A.	d53	d3.44	N.A.	N.A.
1941	N.A.	510	340	16.67	N.A.	N.A.
1943	N.A.	141	91	4.24	N.A.	N.A.
Minnesota & Ontario Paper Co. (Dec. 31):						
1941	22,029	3,422	2,628	1.96	Nil	4¾- 2⅛
1943	23,677	2,464	1,464	1.09	Nil	9⅞- 3¾
1944	23,770	2,043	1,125	0.84	Nil	12 - 7¼
Puget Sound Pulp & Timber Co. (Dec. 31):						
1937	3,043	311	255	0.72	0.75	19½- 7
1939	3,028	116	99	d0.20	Nil	13 - 3⅜
1941	8,379	3,123	1,076	3.08	2.00	18⅜-14
1943	6,373	1,057	457	1.19	0.50	13 - 7
1944	6,469	h1,413	h938	h2.66	1.00	17 -11⅜
Soundview Pulp Co. (Dec. 31):						
1937	6,537	1,987	1,627	3.07	3.00	N.A.
1939	5,768	679	565	0.90	0.25	29⅜-11
1941	13,019	4,814	1,794	3.42	2.00	23½-13¾
1943	10,706	1,845	810	1.40	2.00	21 -15¼
1944	11,682	1,991	754	1.29	1.40	23½-18½
Canadian—						
Abitibi Power & Paper Co., Ltd. (Dec. 31):						
1937	21,755	3,054	3,054	**	Nil	c97 -60
1939	16,146	1,660	1,660	**	Nil	c36 - 4
1941	27,038	5,626	5,626	**	Nil	c15 - 8
1943	29,940	i1,931	i931	**	Nil	c62 -12½
British Columbia Pulp & Paper Co., Ltd. (Dec. 31):						
1937	N.A.	355	225	1.86	Nil	48 - 9
1939	N.A.	d138	d147	d1.86	Nil	10 - 6
1941	N.A.	2,101	601	5.62	Nil	11 - 7
1943	N.A.	264	164	1.25	Nil	8 - 8
1944	N.A.	653	368	3.29	Nil	17 -17
Consolidated Paper Corp. Ltd. (Dec. 31):						
1940	N.A.	1,282	875	0.34	Nil	8½- 3⅛
1941	N.A.	1,520	880	0.34	Nil	4⅛- 2½
1943	N.A.	2,294	1,294	0.50	Nil	6⅜- 3
1944	N.A.	2,708	1,108	0.43	Nil	8¼- 5½
Donnacona Paper Co., Ltd. (Dec. 31):						
1937	N.A.	50	41	0.11	Nil	17½- 7¼
1939	N.A.	11	9	0.02	Nil	N.A.
1941	N.A.	183	105	0.28	0.10	3½- 3⅛
1943	N.A.	345	195	0.52	Nil	7⅜- 3¾
1944	N.A.	474	274	0.72	Nil	8¾- 7
Powell River Co., Ltd. (Dec. 31):						
1937	N.A.	1,977	1,481	1.11	N.A.	N.A.
1939	N.A.	3,548	2,602	1.94	N.A.	N.A.
1941	N.A.	5,627	2,672	1.99	1.80	N.A.
1943	N.A.	4,306	1,737	1.29	1.27	N.A.

*Adjusted for effects of renegotiation (where reported) and inclusion of special voluntary reserves created after taxes. †-Adjusted for split-ups. ‡-Disregarding preferred stock dividend arrears, if any. o-Calendar years. N.A.-Not available. d-Deficit. **Not computable on basis comparable with later years.

a-In order to conform with data for other companies, fiscal periods are those ending April 30 of following year.

b-Since reorganization. c-Per share statistics are for preferred stock. e-40 weeks through Feb. 4, 1945.

f-Nine months through Jan. 31, 1945. g-Paid in preferred stock. (Footnotes to Balance Sheet Data should be read in conjunction herewith).

h-Includes capital gain from sale of Canadian subsidiary.

i-After deducting interest reserve payable.

Note: The foregoing information has been obtained from sources believed to be reliable but is not guaranteed. No responsibility is claimed for the accuracy of the statistical preparation.

ly on political, military and economic strategy emanating from Washington. In summary, it is evident that wages, jobs, prices, controlled production and high taxes will continue throughout next year."

The Weyerhaeuser Timber Co., operators of two pulp mills and other wood-using industries which are being more intensely integrated, said in its report, signed by J. P. Weyerhaeuser, Jr., executive vice president:

"Development looking toward greater utilization of forest raw material has progressed well. A number of products from wood waste are now in pilot plant stage with promise of postwar commercial production. Annual development appropriations are increasing; the fund for postwar capital requirements was increased $3,082,000 during 1944 and now amounts to $10,620,000. Projected developments, delayed by war necessity, run considerably in excess of the existing fund."

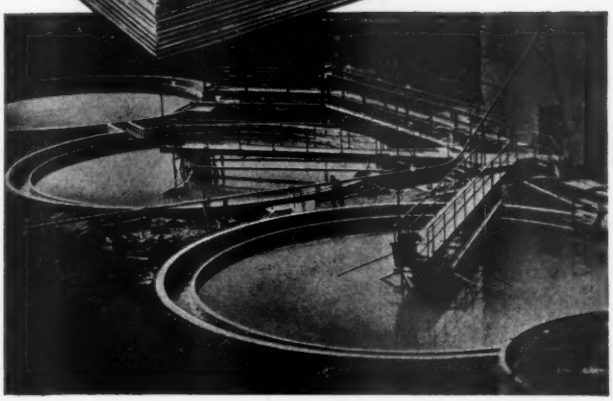
Charts were again published showing the trend since 1936 of the "remainder" available for taxes, employes and shareholders, after provision for purchases, depreciation of plants and timber consumed. For taxes, the figure rose from $2.1 to $16.7 millions in 1942 and edged off to $14.1 millions in 1944. Payrolls rose from $10.8 to $20.6 millions in 1943 and slacked in 1943 to $19.9 millions. Net income, in millions, fluctuated—was $5.1 in 1936, $2.3 in 1938, $8.2 in 1940, $8.6 in 1942, $8.3 in 1943 and $9.5 in 1944. One-third of shareholders' net income was retained in the business to meet needs.

Mr. Weyerhaeuser said most postwar tax programs proposed to date "provide a more realistic incentive to investors."

Corporate Earnings

● A New York Times compilation of corporation earnings for the first nine months of 1944 as compared with the same period of 1943 shows relatively small changes. Figures in parentheses indicate the number of companies included:

	1944	1943
Paper (6)	$2,984,162	$3,023,072
Pulp (1)	533,092	644,403
Containers (6)	4,574,090	3,529,659
Newsprint (2)	8,465,133	8,247,717



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COMPARATIVE SALIENT BALANCE SHEET DATA

(In Thousands of Dollars)

Fiscal Year-end	Total Assets	*Net Fixed Assets	Inventories	Net Working Capital	Funded Debt, etc.	Preferred Stock	Minority Interests	†No. Com. Shares Outstanding
1937	$8,782	$6,487	$1,173	$1,980	$3,072	Nil	Nil	416,028
b American Writing Paper Corp. (Dec. 31):								
1939	8,840	6,272	1,414	1,877	2,316	Nil	Nil	416,068
1944	9,596	4,924	1,040	3,638	2,006	Nil	Nil	360,224
c Brown Co. (Nov. 30):								
1941	44,854	26,205	7,424	12,887	17,349p	$14,448	Nil	1,999,659
1942	43,104	25,303	8,803	11,774	14,853	p14,448	Nil	1,999,659
1944	42,146	22,429	10,276	13,746	15,327	p14,448	Nil	1,999,659
Champion Paper & Fibre Co. (a April 30):								
1936	32,150	21,688	5,076	4,464	5,013	7,750	Nil	551,000
1939	38,385	26,582	5,026	6,401	10,415	8,779	Nil	550,700
1943	50,236	24,385	7,344	20,344	12,455	11,500	$84	550,000
Consolidated Paper Co. (Dec. 31):								
1936	11,344	7,036	1,378	3,282	Nil	Nil	Nil	750,000
1939	8,755	3,469	1,790	4,292	Nil	Nil	Nil	750,000
1944	12,368	2,238	1,260	6,717	Nil	Nil	Nil	750,000
Container Corp. of America (Dec. 31):								
1936	23,633	17,371	2,901	3,544	6,981	Nil	Nil	653,540
1939	26,110	17,617	3,644	4,710	5,126	Nil	Nil	781,253
1944	28,119	15,500	3,737	6,635	Nil	Nil	Nil	781,253
Crown Zellerbach Corp. (a April 30):								
1936	104,600	66,382	11,913	13,204	19,278	52,965	1,212	2,261,199
1939	103,037	62,653	12,741	17,703	13,800	52,966	1,187	2,261,199
1943	105,164	60,386	18,591	29,814	2,573	52,966	1,254	2,261,199
Eddy Paper Corp. (Dec. 31):								
1936	6,730	4,532	1,407	1,491	105	Nil	Nil	177,900
1939	8,157	4,389	1,119	1,134	488	Nil	Nil	185,045
1944	11,299	1,944	998	3,745	Nil	Nil	Nil	164,535
Gair (Robert) Co., Inc. (Dec. 31):								
1936	18,469	12,529	3,076	2,902	4,825	p9,280	650	574,613
1939	17,093	7,819	2,032	1,662	3,563	p9,310	650	574,646
1944	15,552	7,672	2,032	4,126	3,305	3,728	650	1,133,822
d Gaylord Container Corp. (Dec. 31):								
1937	12,872	7,765	1,518	3,445	Nil	5,000	Nil	539,221
1939	12,967	8,034	1,604	3,266	Nil	5,315	Nil	539,221
1944	21,245	11,028	3,607	7,177	5,287	4,511	Nil	541,821
Great Northern Paper Co. (Dec. 31):								
1936	42,604	27,217	7,740	13,356	Nil	Nil	Nil	997,580
1939	43,567	29,057	6,436	12,684	Nil	Nil	Nil	997,480
1944	44,774	28,996	5,663	12,700	Nil	Nil	Nil	997,480
Hammermill Paper Co. (Dec. 31):								
1936	11,882	6,309	1,805	2,833	270	3,803	Nil	180,000
1939	11,051	5,717	2,097	3,790	Nil	2,500	Nil	180,000
1944	12,716	5,204	1,912	5,180	Nil	2,420	Nil	180,000
Hinde & Dauch Paper Co. (Dec. 31):								
1936	11,897	5,754	1,972	3,307	490	3,608	Nil	360,000
1939	12,565	5,987	2,085	3,702	544	3,590	Nil	360,250
1944	14,648	5,315	2,408	5,154	Nil	3,590	Nil	360,250
e International Paper Co. (Dec. 31):								
1936	240,555	179,178	26,588	35,250	80,730	p91,349	15,833	1,822,243
1939	219,867	158,507	25,600	35,605	58,851	p92,594	Nil	1,823,270
1944	249,196	131,402	29,228	71,122	48,796	p92,597	Nil	1,823,855
Kimberly-Clarke Corp. (Dec. 31):								
1936	45,788	28,246	4,096	4,004	5,116	9,963	Nil	487,173
1939	50,858	24,508	5,141	7,688	8,600	9,963	Nil	488,173
1944	61,771	30,816	7,447	15,936	9,528	10,242	Nil	599,760
Marathon Corp. (Oct. 31):								
1936	10,966	7,160	2,199	2,425	2,350	600	Nil	400,000
1939	14,307	7,186	3,499	4,512	3,597	1,199	28	399,134
1944	29,781	9,484	4,702	16,288	10,136	5,000	61	400,000
Mead Corp. (Dec. 31):								
1936	29,752	20,665	3,720	4,326	7,240	3,315	1,023	619,374
1939	34,525	21,904	4,237	5,790	7,536	8,114	876	619,374
1944	37,387	19,756	5,616	9,586	6,000	7,983	153	693,610
f National Container Corp. (Dec. 31):								
1937	6,458	5,017	343	640	2,247	Nil	Nil	660,964
1939	6,787	5,188	416	709	2,343	Nil	7	660,964
1944	12,328	6,918	1,372	2,553	4,522	Nil	44	660,964

(Table continued on page 130)

Canadian Survey

PULP & PAPER INDUSTRY's Canadian survey shows similar circumstances north of the international boundary. Canadian companies have substantially improved their position notwithstanding problems of manpower, raw material shortages, and heavy taxation. Canadian paper stocks have shown a rather strong upward trend for more than two years. And many of these companies are prepared to go ahead with important expansion programs as soon as it is possible to obtain equipment. As for taxation, leaders in the Dominion say that in view of the industry's importance, the government is not likely to handicap its progress. At present, however, as in the U. S., increased revenues would mean little to most companies, due to excess profits taxes. Several large Canadian companies have been definitely cautious about announcing plant expansion, pending clarification of the tax situation.

Analysis

VICTORY in Europe, the vastly improved situation in the Pacific, and important changes in the Washington scene find the pulp and paper industry, financially speaking, demonstrating four clear phases. They are:

1. Companies are producing more than 35 per cent above the peacetime peak of 1937.
2. Earnings are lower due to heavy taxes.
3. Dividends are as high, generally.
4. Stock prices remain low, with some exceptions.

The low prices on many paper stocks is explained by the fact that recalcitrant purchasers have been unable to erase from their memories what has been aptly called "the historic prince and pauper character of the industry." But in clinging to this conception, investors have lost sight of the fact that this characteristic resulted from over-capacity and price difficulties which need not —and, apparently, will not—carry over into the peacetime operations.

Nor do low stock prices take into account a number of very material benefits in store for the industry in the postwar period. There is certain to be a reduction of taxes, the well-informed claim, including the very possible elimination of excess profits tax and a likely reduction in the normal-plus-surtax to perhaps 35 per cent. Also, there will be a

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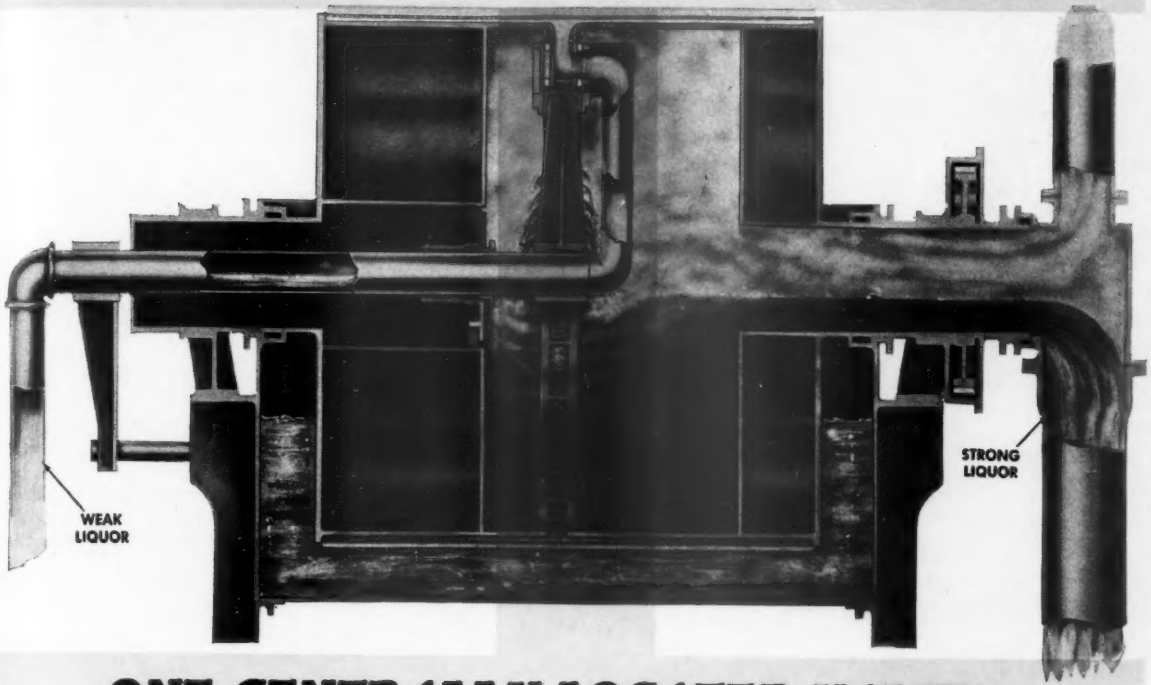

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COMPARATIVE SALIENT BALANCE SHEET DATA (Cont.)

(In Thousands of Dollars)

Fiscal Year-end	Total Assets	*Net Fixed Assets	Inventories	Net Working Capital	Funded Debt, etc.	Preferred Stock	Minority Interests	†No. Com. Shares Outstanding
Oxford Paper Co. (Dec. 31):								
1936	28,560	17,426	2,242	3,803	4,580	p 8,287	Nil	340,172
1939	28,833	16,919	2,603	4,273	4,490	p10,231	Nil	380,735
1944	27,607	14,836	3,257	6,351	1,890	p10,143	Nil	380,735
g Rayonier Inc. (a April 30):								
1937	21,435	17,378	2,161	1,248	425	15,655	Nil	963,872
1939	31,530	24,124	3,559	4,322	6,500	15,655	Nil	963,871
1943	30,433	22,330	3,822	5,000	3,427	15,655	Nil	963,871
St. Regis Paper Co. (Dec. 31):								
1936	58,698	27,704	3,173	4,325	6,910	p4,428	915	4,120,714
1939	59,123	27,278	3,066	6,279	7,899	p4,428	874	4,120,714
1944	58,777	32,179	8,373	18,455	9,708	p7,372	3,345	4,120,714
Scott Paper Co. (Dec. 31):								
1936	7,749	4,508	1,710	2,146	Nil	Nil	Nil	569,980
1939	20,230	9,219	2,380	5,575	702	6,034	Nil	667,956
1944	22,362	9,851	2,613	7,123	Nil	6,030	Nil	667,942
Sutherland Paper Co. (Dec. 31):								
1936	4,826	2,728	924	1,558	Nil	Nil	Nil	287,000
1939	6,515	3,335	2,291	1,732	Nil	Nil	Nil	287,000
1944	7,996	4,078	2,012	2,788	Nil	Nil	Nil	287,000
Union Bag & Paper Corp. (Dec. 31):								
1936	12,715	8,679	2,112	2,946	2,077	Nil	Nil	1,045,732
1939	20,244	14,813	2,397	4,116	4,997	Nil	Nil	1,262,730
1944	26,473	15,870	3,416	6,943	5,859	Nil	Nil	1,271,437
West Virginia Pulp & Paper Co. Co. (Oct. 31):								
1936	56,437	32,855	5,530	12,027	4,000	15,524	Nil	902,660
1939	61,553	38,246	6,793	16,652	9,591	15,583	Nil	902,432
1944	59,345	29,665	6,761	15,136	Nil	15,281	Nil	902,432
Columbia River Paper Mills (Dec. 31):								
1936	5,910	3,554	360	474	635	p680	Nil	20,000
1939	4,422	2,698	664	706	1,503	p200	Nil	20,000
1943	4,741	2,558	815	1,130	1,305	p77	Nil	20,000
hMinnesota & Ontario Paper Co. (Dec. 31):								
1941	44,138	29,991	4,630	8,789	9,757	Nil	Nil	1,344,544
1944	45,180	27,338	5,801	10,982	6,310	Nil	Nil	1,344,543
Puget Sound Pulp & Timber Co. (Dec. 31):								
1937	7,146	4,841	393	350	23	2,473	Nil	251,837
1939	5,642	4,712	265	270	11	2,473	Nil	251,837
1944	10,097	4,444	726	1,027	488	1,121	Nil	326,918
Soundview Pulp Co. (Dec. 31):								
1936	7,431	5,848	576	448	900	293	Nil	418,500
1939	11,218	8,901	1,429	1,323	1,040	2,108	Nil	488,250
1944	12,619	7,860	1,442	1,656	Nil	2,108	Nil	488,250
Canadian—								
rAbitibi Power & Paper Co., Ltd. (Dec. 31):								
1936	121,956	68,599	3,073	2,241	50,485	p35,882	Nil	1,088,117
1939	121,679	65,139	5,895	10,773	50,895	p35,882	Nil	1,088,117
1943	130,324	46,638	7,645	25,532	71,343	p35,882	Nil	1,088,117
British Columbia Pulp & Paper Co., Ltd. (Dec. 31):								
1936	9,015	6,642	556	795	5,177	p556	Nil	100,000
1939	11,161	7,321	894	143	5,311	p556	Nil	100,000
1943	11,506	7,447	1,311	1,693	5,731	p556	Nil	100,000
Consolidated Paper Corp., Ltd. (Dec. 31):								
1936	67,925	56,615	5,840 d	725	52,096	Nil	Nil	2,308,789
1939	60,153	47,367	7,897	7,413	51,565	Nil	Nil	2,308,789
1944	63,782	28,898	12,666	25,812	43,847	Nil	Nil	2,562,702
Donnacona Paper Co., Ltd. (Dec. 31):								
1936	12,392	10,890	907	777	6,584	Nil	Nil	376,572
1939	14,029	11,615	1,257	1,341	7,263	Nil	Nil	376,572
1944	15,823	12,219	2,266	2,447	5,860	Nil	Nil	376,572
Powell River Co., Ltd. (Dec. 31):								
1943	38,964	31,532	2,083	3,568	Nil	Nil	368	1,344,695

*Does not include investments and/or interests in companies not consolidated. †Adjusted for split-ups.

a—In order to conform with data for other companies, fiscal years given are for period ending April 30th of year following: April 30, 1944 latest available. b-Reorganized in March, 1937. c-Reorganized in December, 1939. d-Organized (consolidation) in June, 1937. e-Organized in June, 1941; principal predecessor recapitalized in September, 1937. f-Organized in March, 1937. g-Organized (consolidation in November, 1937. h-Reorganized in February, 1941. r-In process of reorganization. p-Preferred stock dividends in arrears.

Funded debt includes deferred interest on bonds where such condition exists.

Note: The foregoing information has been obtained from sources believed to be reliable but is not guaranteed.

relaxation of wartime restrictions, and already there are foreshadowings of this. And certainly there will be a decrease, a very appreciable decrease, in operational problems involving transportation, labor shortages, pulp supplies, and supplies of other raw materials. A release of cost-saving equipment and the use of methods developed during the war will contribute greatly to an improved position in the immediate future.

Studies carried in recent issues of PULP & PAPER INDUSTRY, notably the Housley and the Neubrech reports (Jan., Feb. issues—reviewed on p. 139 of this issue), indicate that production shrinkage will not be severe. Certainly production will not sink to prewar levels, and many observers in the industry believe, on the basis of their gathered facts and some conservative estimating, that there will be no shrinkage at all. The general production levels industrially, and the national income, are expected to run from 40 to 50% above the prewar levels. The pulp and paper industry cannot possibly avoid its fair share of this picture, and some of the most careful commentators have stated that production should keep running very close to 17 million tons postwar.

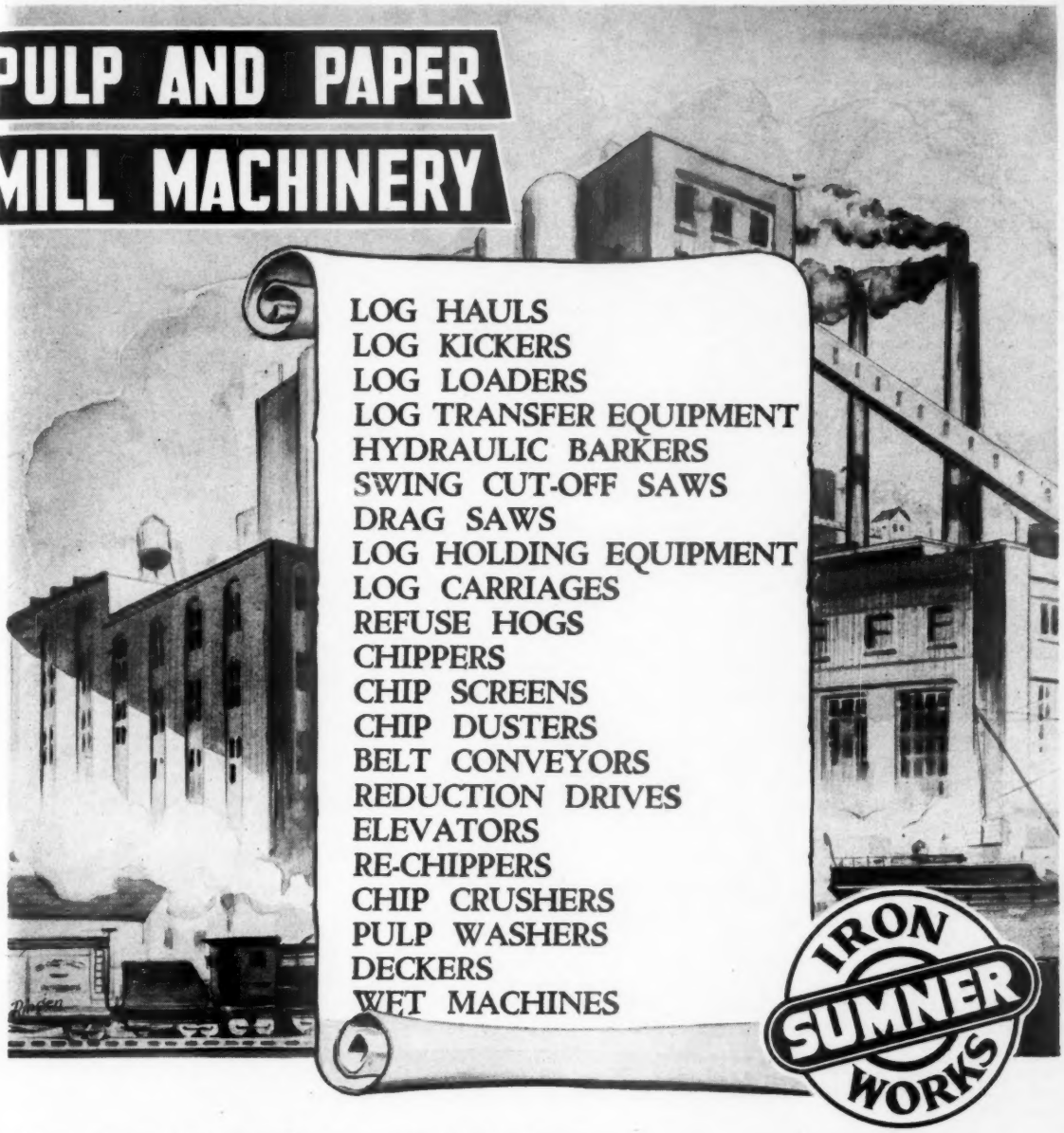
As to foreign competition, the Scandinavian newsprint imports are not expected to be a determining factor in the price structure, and as for Northern European pulp imports—when they do come—they may ease the situation rather than complicate it. Furthermore, the price structure in this war is not overly blown up.

Framing the entire picture is the comfortable fact that there is in the industry a very much better measure of stability than in the years between 1920 and 1940.

Undoubtedly this is the year when the industry flexes its muscles for the jump into peacetime operations, and in this connection it is well to note that most of its wartime products can be adapted for civilian use and that almost no re-conversion problem faces the companies in the field. All that will remain to be done is to change production ratios and reestablish the normal trade outlets.

All in all, it looks like a great setting for profits—and never before in their histories have so many units in the industry been ready and anxious, and prepared for anything.

PULP AND PAPER MILL MACHINERY



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NEWSPRINT--A Few Prophecies; Mills Boost Production in 1945

THE future outlook for the North American newsprint industry is presently very bright, but many factors may alter the picture over a long period.

Said Royal S. Kellogg, veteran secretary of the News Print Service Bureau: "For an indefinite period ahead, there is an indicated demand for every ton of newsprint that the North American mills will be able to turn out. The demand will be large when the brakes are off. There is much bare machine capacity. No such crazy situation is in sight after this war as occurred in 1920, but there are busy times ahead."

Said Clifton Housley, Forest Products Bureau, WPB: "Although the possibility exists that a number of newsprint mills may be built in the South and West within the next few years, it is thought that production in U. S. will not rise above 850,000 tons annually."

Said Robert P. Kernan, president of Donnaconna Paper Co.: "The end of the war will not greatly change the present newsprint situation in Canada. U. S. business has been stimulated rather than depressed during the war, but the war has not brought about any abnormal demand for newsprint."

In making other inquiries in widely separated regions of the conti-

CANADIAN NEWSPRINT MILLS PRO-RATED

● Operations of all newsprint companies in Canada are under government regulation at the present time. Pro-rating of the available business of the industry's 25 newsprint producing companies with each company allotted a fixed percentage of the available business, became effective September 1, 1942.

Under this system, which presumably will last for the war's duration, the percentage allotted to each mill has been based on the rated capacity of that mill, orders on the books, shipments, past performances and other factors.

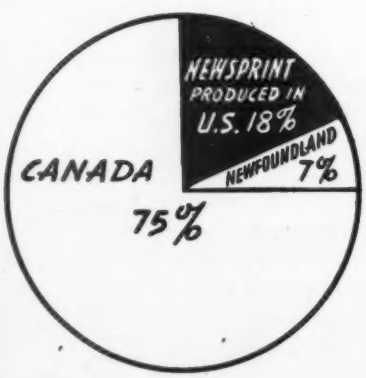
The following table shows the division of tonnage:

Company—	Established Per Cent	Established Share of 3,040,000 Ton Market	Established 1943 Ratio of Operations in Relation to Capacity
Canadian International	15.89	483,056	70.05
Abitibi	13.01	395,504	66.0
Consolidated	12.90	392,160	62.5
Price Brothers	8.52	259,000	69.0
Powell River	5.65	171,760	70.05
Spruce Falls	4.84	147,136	74.0
Anglo-Canadian	4.70	142,880	73.0
Minnesota-Ontario	4.31	131,024	70.5
Ontario Paper	4.28	130,112	80.0
St. Lawrence	4.11	124,944	66.5
Quebec North Shore	3.32	100,928	84.5
Great Lakes	2.76	93,904	80.5
Mersey Paper	2.68	81,472	75.5
Lake St. John	2.30	69,920	68.0
James Maclaren	2.30	69,920	69.5
Donnacona	1.87	56,848	67.0
Pacific Mills	1.85	56,240	75.5
Donohue Brothers	1.07	32,528	68.0
E. B. Eddy	1.00	30,400	65.0
Brompton	0.93	28,272	44.5
Beaver	0.60	18,240	72.5
Bathurst	0.39	11,856	64.5
J. R. Booth	0.30	9,120	60.5
St. Raymond	0.30	9,120	117.0
Provincial	0.12	3,648	36.5
	100.00	2,040,000	69.1

U. S. Newsprint Industry's share Of Domestic Market Continues to Decrease

United States newsprint mills supplied 18 per cent of the total newsprint available for consumption in the country in 1944 as compared with 20 per cent in 1943, 22 per cent in 1942, 25.2 per cent in 1941 25.9 in 1940, 26.1 in 1939 and 27.3 in 1938. In 1915 they produced 76.3 per cent. Correspondingly, supplies from Canada and Newfoundland increased.

Each circle here represents the total amount of newsprint in the United States available for consumption in that year, with percentages supplied from domestic and foreign sources.



1944—

1943—

1915—

REDUCE YOUR
"Down Time"
by installing this
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PULP PUMP

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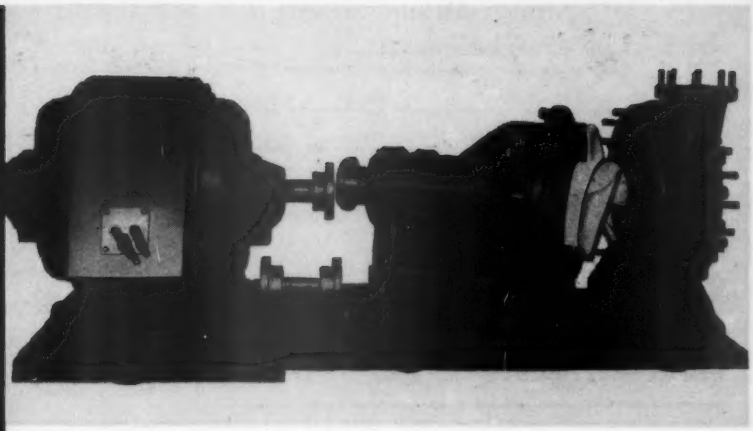
HUSKY AND RELIABLE

★ IT HAS
NO TONGUE AND GROOVE
MOUNTINGS

★ AND LINERS
ARE EASILY RENEWABLE



This simple, rugged, easily dismantled pump is proving that the handling of pulp, of both high and low consistency, can be accomplished within minimum "down time"—plant throughput can be increased and maintenance costs decreased.

An unusually large suction eye keeps velocities low, and the possibility of vapor binding is minimized.

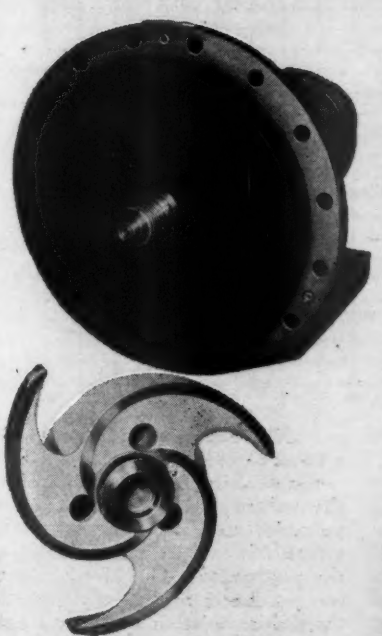
Complete bracket assembly with rotating element, pump cover and liners, can be removed as an assembled unit without disturbing the driver or the pump suction or discharge piping.

Renewable liners—of hardened iron or steel—securely bolted to the pump case covers—can be easily replaced, thereby eliminating the difficult-to-maintain tongue and groove mounting.

Impeller is of open type, mounted on an extra large heat treated shaft with coarse, self-tightening Acme threads.

Stocks with high acid or alkaline content are handled by special materials suited for the specific job.

Write today for further information.



Close-up of liner as bolted to pump case cover and detail of impeller mounted with self-tightening Acme threads.

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NORTH AMERICAN AND U. S. NEWSPRINT PRODUCTION AND USE

U. S. Production, Imports, Exports, Consumption, Inventories

(1,000 short tons)

	Calendar Year (1)1944	1943	1942
Production	721	811	967
Imports	2,491	2,637	2,921
Re-exports	9	2	2
Exports	31	35	42
Total supply	3,172	3,411	3,845
Inventories, total	350	378	489
Publishers'	342	367	479
Mills'	7	11	10
Decrease in stocks	28	111	96
Apparent total consumption	3,243	3,627	3,816

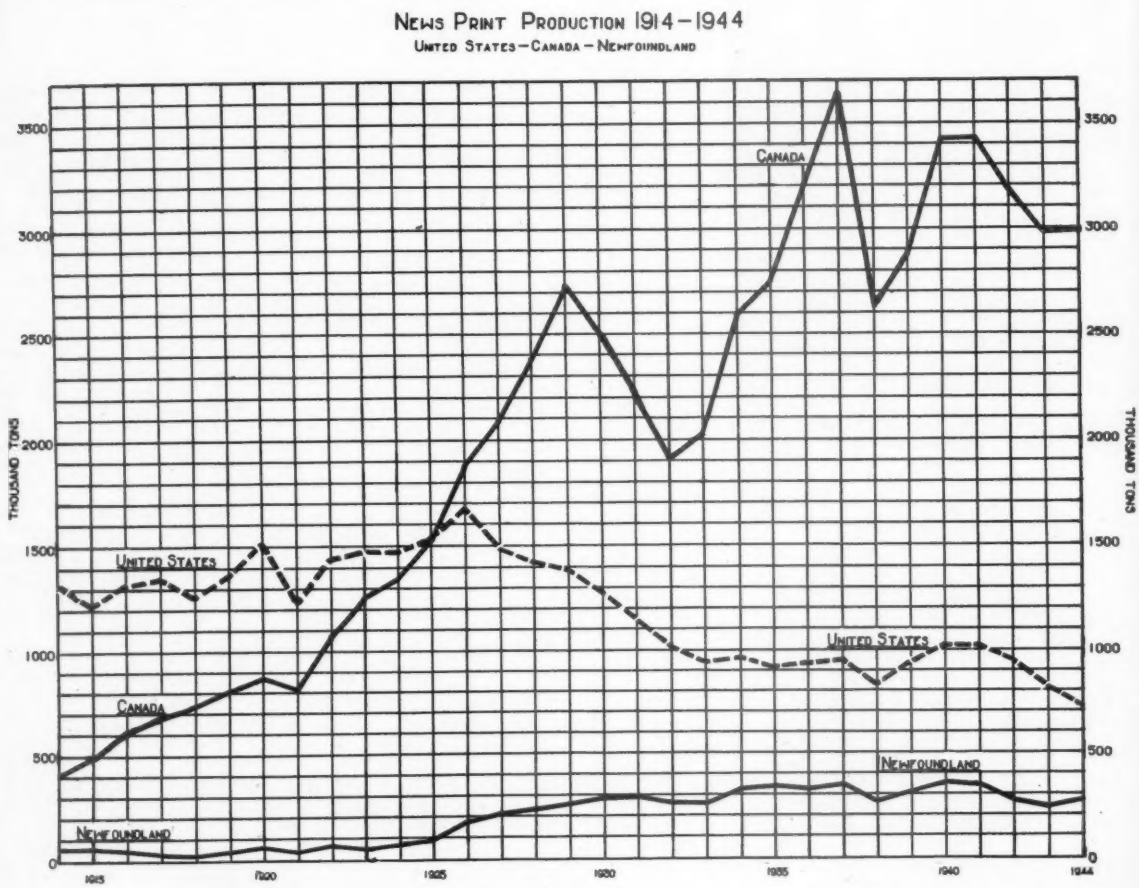
Production of Newsprint In North America

(1,000 short tons)

	Total(1)	United States	Canada	Newfoundland
1944	3,985	721	2,992	273
1943	4,030	811	2,983	236
1942	4,422	967	3,177	277

(1) Totals may not add because of rounding.

Source: United States, Bureau of the Census; Canada and Newfoundland, Newsprint Association of Canada.



nent, PULP & PAPER INDUSTRY finds newsprint machines in the Far West and in the Northeastern states, and even in Canada, which are being—or will soon be—made over to manufacture coating papers, groundwood specialties or other grades bringing a higher financial return than newsprint. However, a newsprint machine in another region has added to production and thus, where certain companies (particularly those in the U. S.) are interested in taking advantage of demand for better papers, there may be others move into the newsprint field.

Taking the long view, fiber for newsprint is going to be costly and increasingly hard to obtain in competition with other pulp producers. Many well informed industry men look for increasing use of fillers of one kind or another in newsprint even including coatings. And there is good reason to expect that the future quality of newsprint will be higer than the world has known.

The third increase in the newsprint price ceiling since it came under OPA control in March 1942—a boost to $63 in March of this year—was encouraging to this branch of the industry. If such a price can be maintained after the war, or increased, it would serve to keep up the production. The North American producers are hopeful that the Swedish association will see the light as they do, and keep their prices similarly within reason.

Production

Mr. Kellogg, in his annual report, said that the 3,984,000 tons of

newsprint made in North America last year was only 1% less than in the preceding year. It was supplied to the extent of 7% by Newfoundland, 18% by the United States and 75% by Canada. There was a slight increase in the Canadian output—9,000 tons—over 1943, a decrease of 85,000 tons in United States production and an increase of 37,000 tons in Newfoundland production.

The newsprint total in Canada in 1944 ranked 6% below the five-year average of 3,175,000 tons, for 1939-43. During the same half decade the Newfoundland mills averaged 303,000 tons, so last year was 10% under the recent average.

The amount of newsprint manufactured in the United States in 1944 was the least in any recorded year since 1900. At that time and for a number of years thereafter domestic mills were the only source of white paper for United States newspapers.

Shipments from the mills aggregated about 10,000 tons more than production during the year, so that on December 31 mill stocks were 10,000 tons less than a year earlier.

Canada's Accomplishment

E. W. Tinker, executive secretary of the American Paper and Pulp Assn., points out that Canada has maintained newsprint shipments to the U. S. at a higher rate than the average of the five-year prewar period, despite discouraging shortages of manpower and equipment. Incidentally, woodpulp exports to U. S. were double those of 1938.

Average production of Canadian mills was 68% of capacity in 1944 as compared with over 78% in 1940 and 1941.

During the first three months of this year, the Canadian mills succeeded in increasing their production of newsprint by 4.6%, while U. S. production was stepped up 4.5%, and Newfoundland's, 6%. This augured well for a maintenance of production rates in 1945 at a time when the newspapers in the U. S. were operating under further reductions in their consumption quotas.

Exports

Exports of newsprint paper from Canada last year are reported by the mills to have been 2,813,000 tons or 94% of production. This was only 3,000 tons less than they exported in 1943, but there was a substantial shift in destinations. In 1944 Canadian overseas shipments were 384,000 tons, compared with 267,000 tons during the preceding year. Correspondingly there was a decrease of 120,000 tons in mill shipments to the United States, the 1944 total being 2,430,000 tons compared with 2,550,000 tons in 1943.

While the proportion of pulp exported from Canada fell from 66% of the production in 1908 down to the present average of about 30%, the proportion of newsprint exported has remained fairly uniform at about 90% of the total production. The ratio of newsprint paper exports to total paper exports has

SOURCES OF NEWSPRINT USED IN THE UNITED STATES

(Tons in Round Numbers)

Source: News Print Service Bureau

	U. S. Production	U. S. Exports	Imports into the U. S. From			Available for Consumption
			Canada	Newfoundland	Europe	
1913	1,305,000	43,000	219,000	----------	1,000	1,482,000
1914	1,313,000	61,000	310,000	----------	5,000	1,567,000
1915	1,239,000	55,000	367,000	----------	1,000	1,552,000
1916	1,315,000	76,000	468,000	----------	----------	1,707,000
1917	1,359,000	94,000	558,000	----------	1,000	1,824,000
1918	1,260,000	97,000	596,000	----------	----------	1,759,000
1919	1,375,000	111,000	628,000	----------	3,000	1,895,000
1920	1,512,000	49,000	679,000	1,000	50,000	2,193,000
1921	1,225,000	17,000	657,000	----------	135,000	2,000,000
1922	1,448,000	26,000	896,000	----------	133,000	2,451,000
1923	1,485,000	16,000	1,109,000	----------	200,000	2,778,000
1924	1,481,000	17,000	1,197,000	4,000	156,000	2,821,000
1925	1,530,000	23,000	1,295,000	20,000	133,000	2,955,000
1926	1,684,000	19,000	1,658,000	94,000	100,000	3,517,000
1927	1,486,000	12,000	1,776,000	89,000	122,000	3,461,000
1928	1,418,000	11,000	1,926,000	114,000	116,000	3,563,000
1929	1,392,000	19,000	2,195,000	132,000	96,000	3,796,000
1930	1,282,000	10,000	1,989,000	156,000	134,000	3,551,000
1931	1,157,000	10,000	1,754,000	160,000	151,000	3,212,000
1932	1,009,000	8,000	1,533,000	114,000	144,000	2,793,000
1933	946,000	11,000	1,545,000	95,000	153,000	2,728,000
1934	961,000	23,000	1,956,000	107,000	147,000	3,148,000
1935	912,000	23,000	2,062,000	124,000	197,000	3,272,000
1936	921,000	15,000	2,422,000	87,000	243,000	3,658,000
1937	946,000	17,000	2,899,000	124,000	294,000	4,246,000
1938	820,000	6,000	1,938,000	94,000	243,000	3,089,000
1939	954,259	13,000	2,206,000	104,600	310,000	3,561,859
1940	1,013,000	44,000*	2,586,000	157,000	34,000	3,746,000
1941	1,058,000	73,000*	2,762,000	217,000	3,000	4,015,000
1942	953,000	42,000**	2,900,000**	120,000**	None	3,800,000
1943	805,000	35,000**	2,792,000**	110,000**	None	3,250,000
1944	717,120	40,161**	2,430.000**	100,000**	None	3,650,000

*Includes paper which is not standard newsprint. Standard newsprint exports from the U. S during 1940 did not exceed 15,000 tons; during 1941 the exports did not exceed 25,000 tons.

**Dept of Commerce figures.

likewise remained much the same for the past 30 years.

While the bulk of Canada's newsprint exports have gone to the United States, Canada's newsprint has been marketed in more than 75 countries—from Abyssinia to the Virgin Islands. Just before the war, the United States was taking about 80 per cent of Canada's newsprint exports; British Empire countries, 17.7%, most of this to the United Kingdom and Australia.

Exports from Newfoundland were 7,000 tons more last year than in 1943, but here also there was a decided shift. Overseas shipments in 1944 amounted to 170,000 tons compared with 132,000 tons a year earlier. There was a corresponding decrease of 31,000 tons in shipments to the United States.

Mr. Kellogg explained that these figures are mill reports, and that the official reports of newsprint exports released by Washington and published in tables on these pages are much larger because of the wide classification used by the Department of Commerce.

The North American mills supplied in 1944 close to 600,000 tons to customers abroad, about 160,000 tons more than in 1943.

The Foreign Economic Administration in Washington, D. C., in its request for WPB allotments, has indicated there is going to be an increasingly heavy demand for newsprint in liberated countries of Europe in the immediate future.

The United States exported 40,161 tons in 1944 to all countries according to the Department of Commerce, which compares with such varied figures in the past as 73,000 tons in 1941 and 13,000 tons in 1939. Canada's overseas shipments in 1943 were 213,000 tons and these are expected to substantially increase.

OVERSEAS EXPORTS OF CANADIAN NEWSPRINT

	Nine Months 1944	Nine Months 1943
United Kingdom	35,013	19,729
Eire	1,300	3,186
Continental Europe	5,259	1,325
Mediterranean Area	3,195	2,757
Egypt	6,821	2,306
Br. South Africa	18,529	2,255
Other Africa	2,205	730
Br. India, Cey., Burma	18,234	7,940
Australia	56,012	12,194
New Zealand	13,226	16,372
Argentina	35,319	35,123
Brazil	33,217	32,062
Uruguay	10,077	8,884
Other So. America	21,990	12,375
Mexico	11,719	5,098
Cuba	9,368	9,045
Br. West Indies	3,672	2,224
Other Caribbean Area	9,569	5,449
Others	6,816	5,727
	301,541	184,781
United States	1,780,023	1,891,516
Total	2,081,564	2,076,297

Source: Newsprint Assn. of Canada.

U. S. CONSUMPTION OF NEWSPRINT

Year—	Population	Newsprint Tons	Paper Used Per Capita
1935	127,521,000	3,300,000	51.7 lbs.
1936	128,429,000	3,650,000	56.8 lbs.
1937	129,257,000	3,830,000	59.3 lbs.
1938	130,215,000	3,458,000	53.1 lbs.
1939	131,878,000	3,550,000	54.1 lbs.
1940	132,817,000	3,730,000	56.2 lbs.
1941	133,923,000	3,930,000	58.7 lbs.
1942	134,633,000	3,800,000	56.4 lbs.
1943	136,497,000	3,650,000	53.5 lbs.
1944	138,101,000	3,250,000	47.1 lbs.

Status of Newspapers

The publishers, reporting to the American Newspaper Publishers Assn., had 24,000 tons less newsprint on hand or in transit on Dec. 31, 1944, than they had a year earlier. With mill stocks 10,000 tons less, a decrease of 34,000 tons in visible supply is thus accounted for. Unaccounted for is an uncertain quantity held by smaller publishers and other users of newsprint whose tonnage must be estimated because of inability to obtain accurate statistics. Altogether, however, there was very close corelation of consumption with production during the year.

At the end the publishers still had on hand a fairly comfortable supply in the aggregate, their stocks amounting to 52 days' consumption at the current rate.

Consumption

The publishers reporting to the A.N.P.A. used 14 per cent less paper than in 1943, 17 per cent less than in 1942 and 20 per cent less than in 1941. Since the undertaking at the first of the year was to use about 20 per cent less than in the base year of 1941, it will be seen that that goal was attained.

The total and per capita use of newsprint paper in the United States for which satisfactory figures are available during the past 10 years are shown in an accompanying table.

It will be noted that the per capita consumption dropped to 47.1 pounds in 1944 or the least since 1933. This compares with a per capita use of 59.3 in 1937 and 58.7 in 1941, the record years. But that is the way the tonnage divides out using the Bureau of Census population figure of 138,101,000. There were so many people in the services abroad however, that the actual use by those at home must have been quite a little above the indicated average.

Since Jan. 1, 1944, U. S. newspapers have been held to reductions on a sliding scale. Maximum cuts are 25% below their 1941 figures and the average are near 20%.

Last year's restrictions in the use of newsprint paper were directly reflected in decreased sizes of publications since circulations went in the other direction.

The leading daily newspapers in the 100,000 circulation and over class which have been checked for 25 years, averaged 23 pages in size in 1944. This was not only 3 pages less than in 1943 but also the smallest year since 1921. There was a corresponding reduction in the size of Sunday issues. Last year's average was 68 pages compared with 10 pages more in 1943 and 20 pages more in 1941. The Sunday papers in 1944 were the smallest of any year in our record.

Editor & Publisher has compiled ABC statements of 249 daily and 143 Sunday newspapers which show nearly 3% increase in daily circulations and under 1% increase in Sunday circulations during the six-month period ending Sept. 30, 1944, compared with the corresponding period in 1943. It is estimated that this compilation covers about two-thirds of the daily circulations and three-quarters of the Sunday circulations. It is certain, therefore, that total newspaper circulations are being maintained at all-time high levels, and going a little higher. The same source estimates that the American reading public pays more than $600,000,000 annually for its newspapers. The fact is also noted that with higher subscription rates there is a greater net revenue per subscriber than ever before.

PLASTICS--Cinderella Industry Is Using More Paper and Pulp

DURING these past few years of war, the pulp and paper industry has "discovered" the plastics industry. This is rather odd, because many years ago the plastics industry recognized the importance of pulp and paper in improving the properties and extending the applications of their product.

Several pulp and paper mills have engaged in the manufacture of specialty pulps and paper for the plastics industries and some companies have their own plastics divisions in which fiber-resin combinations are made and finished articles fabricated. Likewise, some resin or plastics manufacturers operate their own paper mills.

Possibilities of future expansion and of development of new outlets in this field for pulp and paper have created a lively interest in this industry. These possibilities are far more important than the amount of paper and pulp actually utilized in this field today.

According to figures supplied to PULP & PAPER INDUSTRY by the Chemical Unit of the U. S. Department of Commerce, the consumption of wood pulp for the manufacture of plastics has amounted to only 400,000 to 450,000 tons in the past year.

About two-thirds of this figure is represented by rayon pulp, but it does not include such other items as paper laminates—which possibly totaled over 20,000 tons last year, according to an authority in this field—or the pulp that goes into smokeless powder. The latter figure, of course, is a military secret, but it is known that about four times as much smokeless powder is being produced form wood pulp in 1945 as was being made in 1942.

The table published on this page, giving the authorized consumption of wood pulp for non-paper products during three quarters of 1944 and one quarter of 1945 presents only part of the picture.

However, an indication of the small part that plastics has in the total volume of pulp useage is apparent when these quarterly allotments of 100,000 to 110,000 tons is compared with a total availability of about 2,860,000 tons of pulp in the United States in the second quarter of 1945, including 260,000 tons being imported from Canada. On the other hand, the amount of pulp going into plastics looms larger if compared with only 412,000 tons of market pulp available in the U. S. in the second quarter.

Alcohol and Plywood Overlays

As indicated, many lists of plastics are technically incomplete. Even the alcohol now being produced by pulp mills in Bellingham, Wash., and Thorold, Ontario, is enthusiastically incuded in the plastics orbit by the devotees of that industry.

Photographic films — in fact all treated papers—are, in a sense, plastics.

Plywood is claimed as another plastics product. The use of impregnated paper and paperboard overlays in the plywood industry has increased manyfold during 1944 and 1945.

Some chemists foresee a future plywood made entirely of wood pulp with orthodox papermaking processes and combined with plastic glue. The paper and paperboard overalys were adopted by plywood plants because of the increasing difficulty in getting high grade peeler logs. They discovered that, while solving their wood supply problem, they found they could make even a stronger, more attractive and more useful plywood with paper or paperboard on both outside layers. Kimberly-Clark Corp. furnishes paper overlays for four plywood plants now, while others buy the paper and board and impregnate it themselves.

Pulp & Paper Companies In Plastics

Among other pulp and paper companies which have palstics divisions or are actively engaged in producing plastics products are St. Regis Paper Co., with its well known Panelyte division; the Howard Smith Paper Mills in Canada; Riegel Paper Corp.; Weyerhaeuser Timber Co., which has announced a plastic molding powder and is contemplating a postwar plastics plant; Hummel-Ross Fibre Corp., Mosinee Paper Mills, Munising Paper Co., and Detroit Waxed Paper Co., with base papers for plastics markets; Keyes Fibre Co. and Hawley Paper Products, with their molded pulp products; Consolidated Water Power & Paper Co., makers of Consoweld; Marathon Corp., who make a powder and plastic sheets from mill effluent at Rothschild, Wis.; Rogers Paper Manufacturing Co. and other fabricators.

Cellulosic Plastics

A steady and rapid increase in the use of wood pulp as the base material, in place of cotton linters, has been the most striking development in the cellulose plastics field. As of today, practically all of the cellulose acetate produced is made from wood pulp and cellulose acetates are regarded as having a more useful future than the other types. Mills making dissolving pulps are showing an increasing interest in cellulose acetates.

Wood pulp is used in a large proportion by the nitrocellulose and ethyl cellulose manufacturers, also.

AUTHORIZED CONSUMPTION OF WOOD PULP FOR NON-PAPER PRODUCTS

(Short Tons)

	1944			1945
	2nd quarter	3rd quarter	4th quarter	1st quarter
Cellophane	18,879	13,100	14,100	14,100
Rayon	70,903	70,900	75,491	76,276
Plastics	2,113	1,984	2,430	2,747
Molded pulp products	7,913	7,771	7,839	8,038
Miscellaneous*	8,375	7,989	6,714	8,538
	108,183	101,744	108,574	109,699

*Sausage casings, sponges, welding flax, paint and lacquers, etc. The second quarter 1945 allocation of wood pulp for non-paper uses amounted to 243,000 tons which includes exports in addition to the items listed above. No breakdown is available.

Paper Laminates

Production of paper-pulp plastics in the United States have held down only by the lack of raw materials, restricted by the War Production Board controls, according to A. J. Norton, consulting chemist, formerly of Portland, Me., and now of Seattle.

Mr. Norton, who has long been closely associated with pulp-paper-plastics fields, predicted that when the bars are litfed the pulp molds and wood-fill phenolics will rise sharply but cellulosic plastics will show no appreciable increase.

Paper laminates will be a steady field, he thinks. Present production in laminates is about 80 million pounds annually, of which about one-half is the paper used. Pulp molds, he estimates, have reached production of about 2,000 tons annually.

Official 1944 Figures

George H. Sollenberger, deputy chief, plastics branch, U. S. War Production Board, in an authorized analysis of plastics materials production in 1944, given at a New York chemical society meeting, recently, gave these figures on the cellulosic plastics:

For the cellulose-base plastics three broad groups may be established. They are: cellulose esters nitrocellulose and ethyl cellulose.

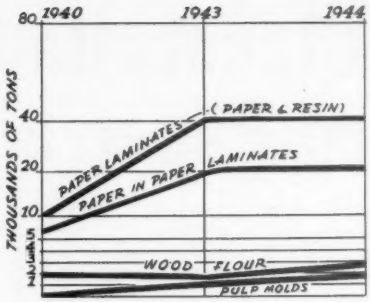
The first—cellulose esters—is the large production item, amounting to about 309,000,000 pounds of flake. of which in the neighborhood of 228,000,000 pounds go to acetate yarn and staple fiber. The balance 81,000,000 pounds, is the base material for lacquers and for 17,000,000 pounds of sheeting and 66,000,000 pounds of molding powder. Figures on the poundages of butyrate and propionate are incorporated in these totals, since they are produced by one firm only.

Cellulose ester plastics are currently in great demand for many highly essential uses, such as aircraft and glider glazing, Grade C Ordnance wrap, pressure-sensitive adhesive tape for military packaging, goggle lenses, gasmask parts rocket parts, flashlights, toothbrushes, and Army bugles and whistles.

Considerable difficulty is being experienced in this field due to exceedingly critical supplies of plasticizers, the direct result of other competing demands for raw materials—the insectifuge and smokeless powder programs for instance. Acetic anhydride, of which 439,000,000 pounds are needed for the produpction of the estimated 309,000,000 pounds of flake, has been in short supply for several months, as have the phthalates. No relief is foreseen for either for an extended period. In fact, increases in the smokeless powder program may drain off some of the cotton now being consumed by this industry.

Good figures are not available (and probably could not be used if they were) for nitrocellulose for smokeless powder, dynamite, lacquers and film. Although the nitrocellulose plastics production rate has been much higher in the past limited supplies of synthetic camphor are keeping the output at about the 12,000,000-pound level. Camphor relief should come with V-E Day but, until that time, there is little hope for any large production of this material for uses other than military items, corrective spectacle frames, fountain pen and mechanical pencil barrels, and ladies' wood shoe covers.

Ethyl cellulose, with two produc-



U. S. LAMINATES AND MOLDS

According to estimates by A. J. Norton, consultant who has been closely associated with plastics and paper industries in New England and the Pacific Coast, the production of paper laminates has remained at about the same level since 1943—40,000 tons—because of restrictions on materials. About half the tonnage is paper and the other half resin.

Wood flour fell off slightly from 2,000 tons before Pearl Harbor, but Mr. Norton estimates it is now up to a 3,000-ton annual rate. Pulp molds, he says, have risen steadily from practically zero in 1940 to around 2,000 tons per year.

U. S. CELLULOSE PLASTIC PRODUCTS: PRODUCTION, AND SHIPMENTS AND CONSUMPTION 1942-1944

(In Pounds)

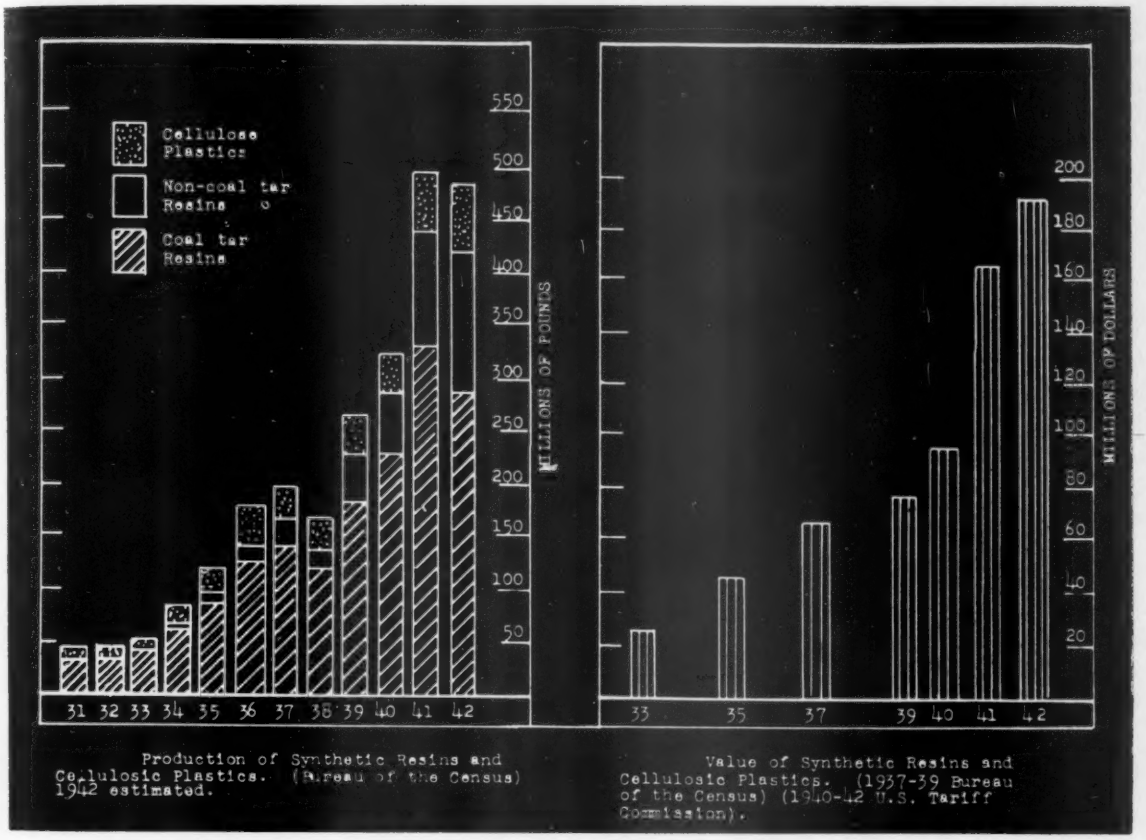
	NITROCELLULOSE								CELLULOSE ACETATE			
	Total		Sheets		Rods		Tubes		Sheets, rods, and tubes		Molding composition	
	Production	Shipments and consumption	Production	Shipments and consumption	Production	Shipments and consumption	Production	Shipments and consumption	Production	Shipments and consumption	Production	Shipments
1942	15,128,826	16,038,188	10,422,370	10,838,323	3,662,075	3,819,016	1,044,381	1,380,849	7,453,307	6,777,324	40,792,518	38,794,514
1943	14,042,348	14,530,299	8,929,257	9,323,639	4,280,853	4,409,707	832,238	796,953	10,163,467	10,082,236	44,222,714	42,214,571
1944												
January	1,275,119	1,209,993	791,671	770,263	409,823	377,964	73,625	61,766	798,925	838,260	4,040,660	3,705,769
February	1,443,101	1,318,505	920,565	793,903	450,050	472,650	72,486	51,952	721,952	868,261	4,213,788	4,019,165
March	1,468,320	1,479,146	931,996	917,165	459,720	480,003	76,604	81,978	646,137	822,248	4,482,339	3,878,183
April	1,474,637	1,511,507	947,496	951,989	431,395	467,117	95,746	92,401	676,416	622,199	4,878,333	4,544,239
May	1,456,855	1,469,530	882,587	897,395	484,628	483,626	89,640	88,509	762,307	842,301	5,204,868	4,672,882
June	1,468,681	1,561,850	907,405	943,928	448,191	505,433	113,085	112,489	704,136	757,546	4,860,128	4,528,425
July	1,198,118	1,291,518	726,664	774,303	381,927	419,223	89,527	97,992	736,111	675,785	4,517,606	4,207,545
August	1,382,746	1,319,348	894,642	820,133	396,356	410,655	91,748	88,560	730,922	731,818	5,007,831	4,504,670
*8 mo. 1944	11,167,577	11,161,397	7,003,026	6,869,079	3,462,090	3,616,671	702,461	675,647	5,776,906	6,158,418	37,205,553	34,060,878

*Released as of March 2, 1945. For reasons of national security figures for late 1944 months and recent months were withheld.
Source: Bureau of Census.

CELLULOSE PLASTIC PRODUCTS—1942-44

Data above are based on reports of 15 manufacturers which represent practically the entire industry. Nine manufacturers make cellulose nitrate products, six make cellulose acetate products and ten make cellulose acetate molding composition. Beginning October, 1943, data are included for two companies which produce cellulose acetate molding composition from scrap material. While these companies were in operation prior to October, 1943, comparability of the data is little affected; in that month, they made no shipments and accounted for only 2 per cent of total molding composition production. One additional company reported cellulose acetate sheets, rods and tubes for the first time in November, 1943. The production of this company is so small that comparability is unaffected.

The production, and shipments and consumption figures represent data reported by prime manufacturers of cellulose plastic material and include no data for plastic molding which manufacture products from purchased material. This results in some understatement of the data for cellulose acetate sheets, rods and tubes. Manufacture of these products from purchased material, however, is reflected in the data here shown for shipments of cellulose acetate molding composition. The statistics shown for sheet forms do not contain data for safety glass sheeting. They may, however, contain data for some wrapping material, since the report form does not specify that such should be excluded.



Production of Synthetic Resins and Cellulosic Plastics. (Bureau of the Census) 1942 estimated.

Value of Synthetic Resins and Cellulosic Plastics. (1937-39 Bureau of the Census) (1940-42 U.S. Tariff Commission).

ers, is operating at a rate of less than 12,000,000 pounds, although additional facilities are being readied to take care of the heavy demands for rocket parts, classified war items, lacquers, the well-known "strip-coat" type of military packaging, Army flashlights and many similar products.

(These figures showed substantial increases over 1943. Ethyl cellulose production, for example, is reported to have nearly tripled in a year.)

Resins Statistics

Mr. Sollenberger also disclosed some interesting statistics on resins:

In the group — phenolic resins and molding compounds—plywood resins are being turned out at a rate of about 36,000,000 lbs. per year. This represents a plywood otuput of about 600,000,000 sq. ft. on the basis of 3-ply material.

Specialty resins, used in a large number of classified military applications, in grinding wheels, brake blocks, electrical insulation, heat-insulant bonding, stamping and forming dies for light metals, adhesives for metal bonding, ion-exchange resins for water purification and lamp-base cements account for another 55,000,000 pounds.

Roughly, 96,000,000 pounds of laminating varnish—60 per cent resin is a good average for this material—is consumed in the manufacture of about an equal weight of laminates for electrical and structural uses, for helmet liners, instruction panels, silent gears and various corrosion-resistant items. Protective coatings for military and industrial equipment take another 44,000,000 pounds or so of phenolic resin, while a substantial amount goes into the manufacture of 120,000,000 pounds of phenolic molding powders.

Total figures on phenolic resins and molding compounds is about 350,000,000 pounds.

Since the fourth quarter of 1944 the limited availability of phenol has held down production of phenolic resins.

The urea and melamine resins are comparable to phenolics in that the total output of these two materials —126,000,000 pounds of resin and molding compounds, which consume 102,000,000 pounds of formaldehyde—must be broken down in components before the figures mean much.

Specialty and adhesive resins are running about 84,000,000 pounds. They are used in high wet-strength paper for maps, blueprints and invasion currency; in laminates; in plywood for such miscellaneous end uses as shipping containers; in wood-working adhesives; paper laminates for V-boxes; foundry sand-core binders; and in textile treatment to reduce shrinkage, to increase wear and to make shoddy fabrics usable. Urea and melamine molding compounds account for 36,000,000 pounds of the 126,000,000-pound total. This, of course includes the bulk fillers. The protective coating use of these resins eats up 6,000,000 pounds.

In January and February of 1945 resins were in trouble due to formaldehyde difficulties. Earlier, serious trouble was encountered as a result of competition for production time among ammonia for mixed fertilizer, methanol for Lend-Lease and methanol for normal domestic industrial uses such as the production of formaldehyde.

The U. S. Tarriff Commission reported a total production of phenolics in 1943 at 144,541,000 lbs. (net resin content) which was derived as follows: moldings, 62,424,000 lbs.; castings, 2,838,000 lbs.; laminating, 23,118,000 lbs.; protective coatings, 15,519,000 lbs.; adhe-

CELLULOSE ESTERS AND ETHERS USED IN PLASTICS MOLDING INDUSTRY

Ethylcellulose	
Ethocel	Dow Chemical Co., Midland, Mich.
Hercules E. C.	Hercules Powder Co., Wilmington, Del.
Cellulose acetate	
Bakelite	Bakelite Corporation, New York, N. Y.
Chemaco	Chemaco Corporation, Berkeley Heights, N. J.
Herculoid	Hercules Powder Co., Wilmington, Del.
Fibestos	Monsanto Chemical Co., Springfield, Mass.
Lumarith	Celanese Celluloid Corporation, New York
Nixonite	Nixon Nitration Works, Nixon, N. J.
Plastacele	E. I. du Pont de Nemours & Co., Inc.
Tenite I	Tennessee Eastman Corporation, Kingsport, Tenn.
Cellulose acetate butyrate	
Tenite II	Tennessee Eastman Corporation, Kingsport, Tenn.
Cellulose nitrate	
Celluloid	Celanese Celluloid Corporation, New York, N. Y.
Hercules C. N.	Hercules Powder Co., Wilmington, Del.
Nitron	Monsanto Chemical Co., Springfield, Mass.
Nixonoid	Nixon Nitration Works, Nixon, N. J.
Pyralin	E. I. du Pont de Nemours & Co., Inc.

sives, 10,290,000 lbs., and miscellaneous uses, 11,527,000 lbs.

The commission reported 53,859,000 lbs, of urea resins were produced in 1943.

The January 25 bulletin of Arthur D. Little, Inc., presents the following figures as a summation of production in part of plastics industry:

	Lbs. per Mo.
Phenolic molding powders	10,000,000
Urea and melamine molding powders	3,000,000
Cellulosic molding powders	5,500,000
Laminates	6,700,000
Total	25,200,000

This monthly total of 25,000,000 pounds represents an annual rate of 302,000,000 pounds.

A summation of the individual material figures gives a total of about 790,000,000 pounds as the annual rate of production for all major classes of plastics and resins according to Mr. Sollenberger. Of this, approximately 413,000,000 pounds may be considered as structural or rigid plastics.

Postwar Picture

Discussing the postwar picture, he said:

"Wise designers will take advantage of the divergent physical and chemical properties of metals and plastics, and will combine them so that they are complementary instead of competitive. The utter futility of competition can be established by comparing 2 billion pounds of aluminum or about 178 billion pounds of steel ingots with 413 million pounds of rigid plastics. The plastics production is only 21% as great as that of aluminum and 0.2% that of steel.

"While the postwar plastics situation would appear to be very good it is of the utmost importance that the industry keep at least one foot on the ground. We all realize that the readers of the Sunday supplements are eagerly awaiting plastic houses, plastic automobiles and plastic airplanes. This phase, however, should cause little trouble for we also realize that such things are not within the realm of present-day possibilities. Smaller, less sensational products can be the source of even more embarrassment to the industry if, in a desire to rush items onto the market, processors do not see that they are properly engineered and the correct material selected. Responsibility in this matter rests equally with the material manufacturer and the molder or fabricator."

Dr. Donald T. Jackson, Hammermill Paper Co., Erie, Pa., who has made—with associates of his company—one of the most exhaustive surveys of possibilities in the plastics industry for the pulp and paper industry, has this to say, in a communication to PULP & PAPER INDUSTRY:

"The Cinderella-like rise of plastics from relative industrial obscurity to a position in the spotlight of public acclaim has probably been caused almost equally as much by what they are expected to do in the future as by what they are now doing or have done in the past. Feature articles in newspapers and magazines, optimistic industrial advertising, pitcuresque war applications and the natural tendency of the American public to exaggerate anything new has served to place the plastics industry in a position where a proper perspective is difficult to obtain. The public has been led, largely by its own wishful thinking, to believe that plastic automobiles, plastic planes, boats, houses, bathtub and furniture await only V-day to make their appearance on the industrial scene.

"Many of us in the paper industry have likewise failed to get or to keep the plastics industry in proper perspective to our own. It can in no way lessen our appreciation of the marvelous work which palstics have done and are doing in the war and which they will undoubtedly do when peace comes if we make this comparison."

Dr. Jackson noted that the plastics industry (cellulosic and resins), as of 1939, was shown by the bureau of the census as having a total value of only $77,653,000 as compared with $4,039,000,000 for the motor car industry, $2,720,000,000 for steel mills, $933,016,000 for the paper and paperboard industry and $247,066,000 for rayon and allied products. However, he points out, the plastics industry has grown since then and is one of the fastest growing of all.

Howard Smith Plastic Plan

● Construction of the lignite plastic plant of Howard Smith Paper Mills, Montreal, is well advanced and operations on a semi-commercial basis will begin soon, according to President Harold Crabtree.

Mr. Crabtree states that although there has been some improvement in pulpwood supply, labor shortage is still critical, making it impossible to obtain the normal requirements of peeled pulpwood. Accordingly, the company had to resort largely to the use of rough wood, requiring new barking equipment.

Paper Aids Farmers

In rural areas, paper is becoming increasingly important. Egg crates are being made of corrugated paper board with collapsible construction, especially designed and reinforced to give strength and durability. Other farm goods now obtainable in fabricated or moulded paper and paper base plastic include sanitary poultry breeders, housings for electrical chicken brooders, and paper binder twine for bundling grain.

Baking dishes can now be made of special paper that resists heat to 350 degrees.

Buckley Heads Papermakers

● Richard S. Buckley, technical director, Fernstrom Paper Mills, was elected chairman of the Papermakers & Associates of Southern California at Los Angeles April 19. A complete report on the meeting will be published next month in our next regular issue.

RAYON--Half of Dissolving Wood Pulp Goes Into Its Processes

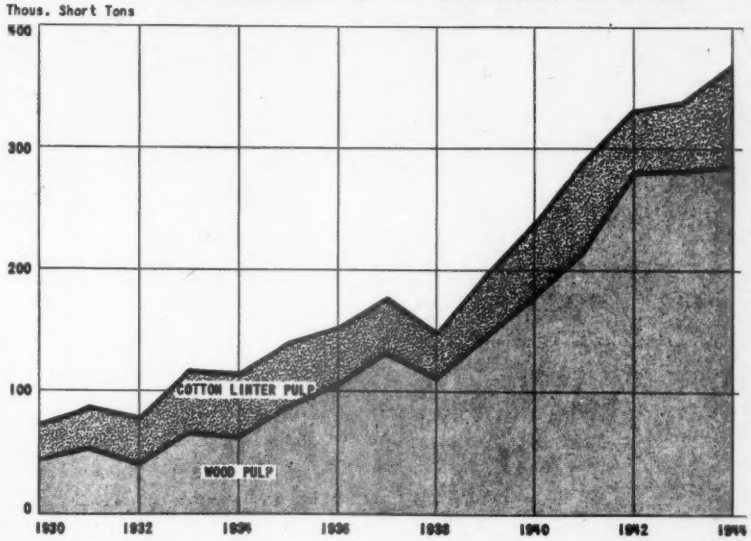
RAYON manufacture is one of the world's most rapidly growing industries. The use of dissolving wood pulp as the raw material for rayon, has increased at even a faster pace and today it is by far the principal material used.

Because of lower cost, uniformity of fiber and improved manufacturing processes, the use of wood pulp is expected to show even greater gains over its rival—cotton linters—as rayon's postwar raw material.

War has brought about a concentration of research and development in use of fibers to the point where fiber-using industries know more about them than they would have otherwise. Spectacular wartime uses of rayon have been in the public eye—what the general public doesn't know are the marvelous articles of rayon which have been developed in laboratories for postwar and which will be revealed on the markets when the industry no longer has to concentrate on parachutes, tire cord and other materials for the armed forces.

American Viscose Corp. in the past year announced development of a strong rayon fiber as fine as silk and interesting developments also are taking place in the acetate rayon field.

CELLULOSE CONSUMPTION BY U. S. RAYON INDUSTRY 1930 TO 1944



The U. S. rayon industry used 285,000 tons of wood pulp in 1944, according to Rayon Organon, publication of the Textile Economics Bureau, Inc. This represents over one-half of the total dissolving wood pulp consumption of 550,000 tons in the U. S. during 1944.

Classifying the cellulose consumption according to its use by the two main classifications of the rayon industry, the viscose and cupra producers use between 75 and 80% wood pulp and the remainder linters pulps, while the acetate division employs approximately 70% wood pulp, the balance of 30% being linters pulp.

New Record Highs

According to estimates by the Textile Economics Bureau, the consumption of cellulose by the United

CELLULOSE CONSUMPTION BY THE U. S. RAYON INDUSTRY

Short Tons of Refined Cellulose

	TOTAL PULP		WOOD PULP*		LINTERS PULP*		RAW COTTON LINTERS†
	Tons	Per Cent	Tons	Per Cent	Tons	Per Cent	Bales
1930	72,000	100	45,000	62	27,000	38	115,000
1931	84,000	100	53,000	63	31,000	37	132,000
1932	74,000	100	43,000	58	31,000	42	132,000
1933	115,000	100	65,000	57	50,000	43	213,000
1934	112,000	100	63,000	56	49,000	44	209,000
1935	137,000	100	86,000	63	51,000	37	218,000
1936	151,000	100	104,000	69	47,000	31	201,000
1937	176,000	100	132,000	75	45,000	25	187,000
1938	147,500	100	110,000	75	40,000	25	160,000
1939	194,500	100	145,000	75	53,000	25	211,000
1940	238,000	100	178,000	75	60,000	25	256,000
1941	287,500	100	214,500	75	73,000	25	312,000
1942	330,000	100	280,500	85	49,500	15	211,000
1943	336,500	100	281,000	84	55,500	16	237,000
1944	367,000	100	285,000	78	82,000	22	350,000

*Wood and linters in purified form as used by rayon producers.

†Bales of raw cotton linters figured on the basis of one-third overweight on refined linters pulp (due to refining losses) and converted to bales on the basis of 625 pounds net weight per bale.

Source: Rayon Organon, April, 1945.

States' rayon industry during 1944 reached a new, all-time high of 367,000 short tons of wood and linters pulp.

Production of rayon, both yarn and staple fiber, by United States mills totaled 723,900,000 pounds in 1944. This output exceeded the previous record 1943 total of 663,100,000 pounds by 9 per cent.

Due to the greatly expanded production of rayon tire yarn to over 115,000,000 pounds, viscose plus cuprammonium rayon yarn production increased 13 per cent to 383,500,000 pounds in 1944, compared with a total of 338,500,000 pounds in 1943.

Acetate rayon yarn output increased 5 per cent from 162,600,000 pounds in 1943 to 171,700,000 pounds in 1944, a figure slightly above the previous record output of 168,900,000 pounds produced in 1942.

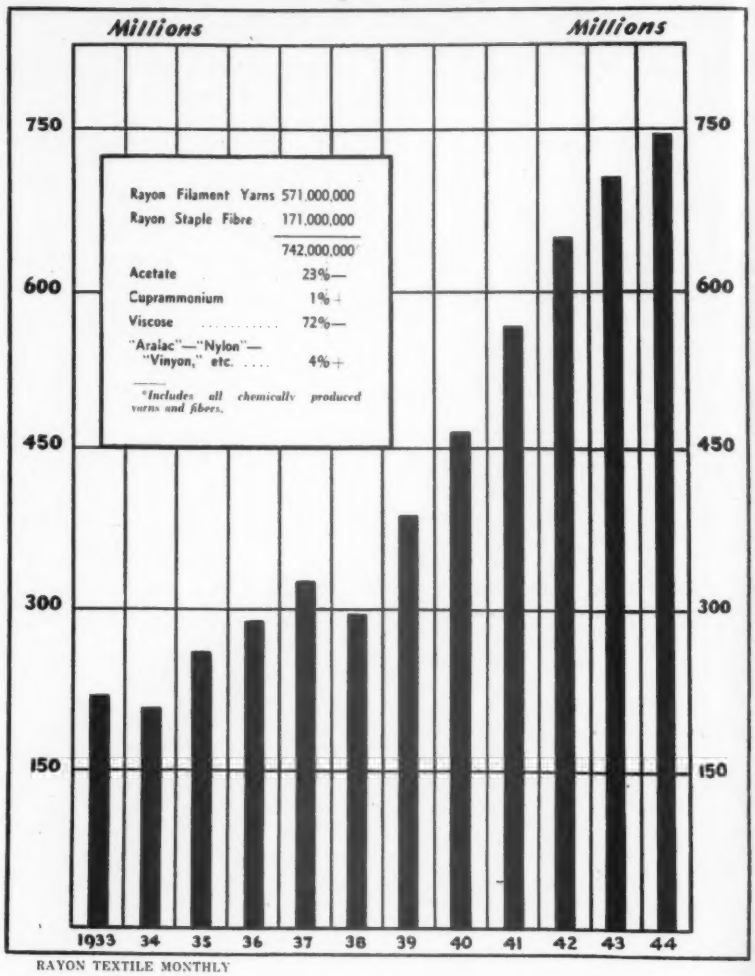
Rayon staple fiber production increased 4 per cent to a new high figure of 168,700,000 pounds in 1944, compared with the 1943 total of 162,000,000 pounds.

World production of rayon increased up to 1942 but probably declined since then because of the war. However, recent reports tell of either already achieved or planned expansion for postwar in Britain, Sweden and Russia and likewise the industry has grown in South America, importing some wood pulp.

World production of rayon increased at an average rate of 32% per year during the period of 1920 through 1929 and 17% from 1930 through 1940. In 1920, world production of rayon was only about 33 million pounds, but by 1940 this quantity had increased more than seventyfold, to 2,381 million pounds. World production is reported to have increased still further, to a peak of 3,473 million pounds, in 1942.

U. S. rayon exports increased from 1943 to 1944, especially those going to Canada. Total yarn exports for 1944 were over 16,000,000 pounds, representing an increase of about 75 per cent over the 1943 level. Not included in these exports are rayon tire cord and fabric, staple fiber and spun rayon yarn, rayon fabrics in the piece, rayon hosiery and garments, etc., the total amount of which is unknown. It is probably safe to assume, however, that such exports were comparable with prewar levels.

U. S. A. Rayon Production



RAYON TEXTILE MONTHLY

United States Rayon Production in Millions of Pounds

	1944	1943	1942	1941	1940	1939	1930
Rayon Filament Yarn	555.2	501.1	479.3	451.2	390.1	328.6	127.3
Rayon Staple Fiber	168.7	162.0	153.3	122.0	81.1	51.3	0.4
TOTAL	723.9	663.1	632.6	573.2	471.2	379.9	127.7

United States Rayon Consumption in Millions of Pounds

	1944	1943	1942	1941	1940	1939	1930
Rayon Filament Yarn	539.0	494.2	468.8	452.4	388.7	362	118
Rayon Staple Fiber	165.7	162.0	151.8	133.6	99.1	96.5	1
TOTALS	704.7	656.2	620.6	586	487.8	458.5	119

Predicts More Expansion

The U. S. Department of Agriculture issued a rayon industry survey last winter, in which it stated:

"The rapid increases in the production of rayon in countries such as the United States and Great Britain have been the result of a natural expansion in the use of a new textile fiber. In Germany, Japan, and Italy, on the other hand, production of rayon was increased tremendously during the years immediately preceding World War II by governmental policies designed to increase the use of synthetic fibers, in the place of natural fibers, which would have to be imported.

"Further expansion in the use of rayon during the next few years may be expected, although the extent of these gains cannot be accurately predicted. Although the percentage rate of increase in rayon production from year to year in the United States and in the world is no longer so great as in the early years of the industry, actual year-to-year increas-

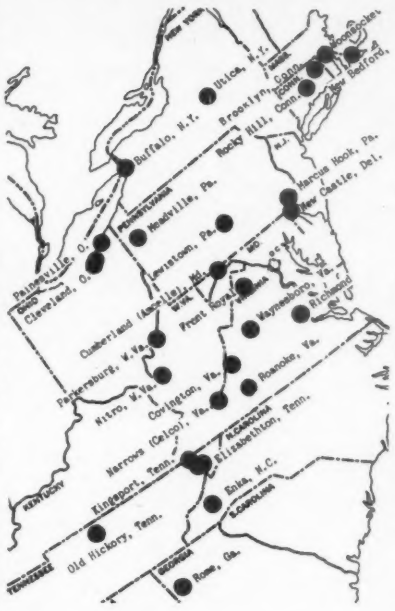
es have been larger during the last few years than at any previous time. Despite these increases, rayon now comprises only about 10 per cent of the total quantity of cotton, wool, rayon, and silk consumed in the United States, as compared with about 80 per cent for cotton, 9 per cent for wool, and 1 per cent for silk (average 1939-43). Much of the future of rayon will depend, of course, upon improvements in its properties and upon its price. In view of such recent developments as high-tenacity rayon and rayon tow, there are no indications that the technological progress of the industry has slackened. Despite wartime rises in prices in general, rayon prices have either remained at prewar levels or have declined slightly, and there are indications that further reductions in rayon prices are possible in the postwar period.

"The basic material used in the manufacture of rayon is cellulose, which is obtained for this purpose from special grades of wood pulp (chiefly from spruce, western hemlock, and southern pine) and from cotton linters. Continued improvements in the quality of wood pulp make possible its use in additional types of rayon, and wood pulp is available at a lower cost than cellulose obtained from linters.

"The first commercially produced rayon was weak, glossy, and highly irregular and was used mostly as a substitute for silk in cheap fabrics or for decorative purposes in mixtures with other fibers. Modern rayon is made with varying degrees of luster, is much stronger in both the dry and the wet state, and is more uniform in all its properties. At the same time that these improvements in quality were being effected, its price was being reduced.

"The tremendous expansion in the use of rayon, up to the present, has been predominantly into apparel (particularly women's) and household goods, in fabrics where appearance is the factor of major importance. Recently, however, the development of high-strength types of rayon has made possible the expansion of rayon into such uses as parachutes and military vehicle and airplane tires, where a comparatively high tensile strength is required. Although consumption of rayon continues to increase rapidly, its field of expansion, with its present properties, has definite limits."

LOCATIONS OF RAYON PLANTS IN U. S.



Companies, locations and processes:

American Bemberg Corp., Elizabeth, Tenn. (cuprammonium); American Enka Corp., Enka, N. C. (viscose); American Viscose Corp., Front Royal, Va., Lewiston, Pa., Marcus Hook, Pa., Nitro, W. Va., Parkersburg, W. Va. and Roanoke, Va. (viscose), and Meadville, Pa. (acetate); Celanese Corp of America, Cumberland, Md., and Narrows, Va. (acetate); Delaware Rayon Co., New Castle, Del. (viscose); E. I. du Pont de Nemours & Co., Buffalo, N. Y., Old Hickory, Tenn., and Richmond, Va. (viscose), and Waynesboro, Va. (acetate); Hartford Rayon Corp., Rocky Hill, Conn. (viscose); Industrial Rayon Corp., Cleveland, Painesville, O., and Covington, Va. (viscose); Manville Jenckes Corp., Woonsocket, R. I. (viscose); National Rayon Corp., Cleveland (viscose); New Bedford Rayon Co., New Bedford, Mass. (viscose); North American Rayon Corp., Elizabethton, Tenn. (viscose); Skenandoa Rayon Corp., Utica, N. Y. (viscose); Tennessee Eastman Corp., Kingsport, Tenn. (acetate); Tubize Rayon Corp., Rome, Ga. (viscose and acetate), and U. S. Rayon Corp., Brooklyn, Conn. (cuprammonium).

Wood Pulp vs. Linters

It will be noted, in an accompanying table and chart, that during 1944 the use of cotton linters in the U. S. increased by a greater margin than the use of wood pulp. While wood pulp utilization mounted by 4,000 tons (1.4%), its share in the total utilization of cellulose by the industry fell off from 84% to 78%.

The principal reason for this was the very tight supply of high alpha or dissolving pulp as compared with the easier supply of linters pulp.

There have been so many critical war demands for wood pulp for all kinds of products and the manpower problem has so gravely hampered the pulpwood production, that it is surprising that pulp for rayon showed any increase at all.

An important demand for dissolving pulp is as the raw material for smokeless powder, now used to fire all medium and heavy artillery of the U. S. army. The British navy also is a big user of powder made from wood pulp. Two U. S. mills and one Canadian mill which have been important rayon pulp producers have been required to turn their pulp over to the smokeless powder plants.

Tire Cord Program

Rayon Organon said another reason for cotton linters showing a bigger increase in use than wood pulp in the past year is that several producers of high tenacity yarn favor the linters pulp. However, considerable use is also made of wood pulp in this process.

The tire expansion program in this past year has been probably the most important development in the rayon industry. High government and army officials proclaimed the rayon tire cord was at last established as definitely superior to cotton cord for use in airplane, army

ANNUAL FIBER CONSUMPTION IN THE UNITED STATES

(Units are Millions of Pounds and Percent)

	COTTON		WOOL		RAYON		SILK		TOTAL	
	Pounds	%	Pounds	%	Pounds	%	Pounds	%	Pounds	%
1920	2,828.1	88.9	314.2	9.9	8.7	0.3	29.2	0.9	3,180.2	100
1930	2,610.9	85.0	263.2	8.6	118.8	3.9	75.7	2.5	3,068.6	100
1935	2,754.7	78.9	417.5	11.9	259.0	7.4	62.3	1.8	3,493.5	100
1940	3,953.6	81.0	411.1	8.4	482.0	9.9	35.8	0.7	4,882.5	100
1943	5,258.3	80.4	628.0	9.6	656.2	10.0	nominal		6,542.5	100
1944	4,781.2	78.3	623.7	10.2	704.7	11.5	nominal		6,109.6	100

Source: Rayon Organon.

truck and other tires. Yet despite all the efforts of the industry, army and government, the expansion of the rayon industry had reached the point at the end of 1944 where only 70% of requirements in tire yarn was being produced. The production rate at that time was 168,000,000 pounds annually. But since then the war program has been boosted. It is expected that 245,000,000 pounds will be produced in 1945 with 296,000,000 pounds as the potential set for 1946.

Of the five producers of high tenacity yarn, one of them—the Industrial Rayon Corp., of Cleveland, Ohio, has informed PULP & PAPER INDUSTRY that it uses wood pulp exclusively. Three others are reported to use both wood pulp and cotton linters.

First plant in the country to bring all steps in the manufacture of rayon cord tire fabric under one roof, Industrial Rayon Corp.'s Cleveland mill has been expanded to nearly double its pre-war capacity to meet demands for sturdier army truck, artillery and aircraft tires. Cord and fabric produced at the Cleveland plant gives synthetic rubber tires the high strength and heat resistance that enable them to stand the gaff of battle service.

By setting up the first weaving mill ever established west of the Alleghenies and north of the Mason-Dixon line for the manufacture of rayon or cotton goods, Industrial Rayon has established a new short cut between pulpwood forests and the fighting fronts. Continuous process machines make the viscose derived from sheets of wood pulp into finished tire yarn, and it moves right through twisting, warping and weaving departments which ship both cord and fabric direct to the tire plants.

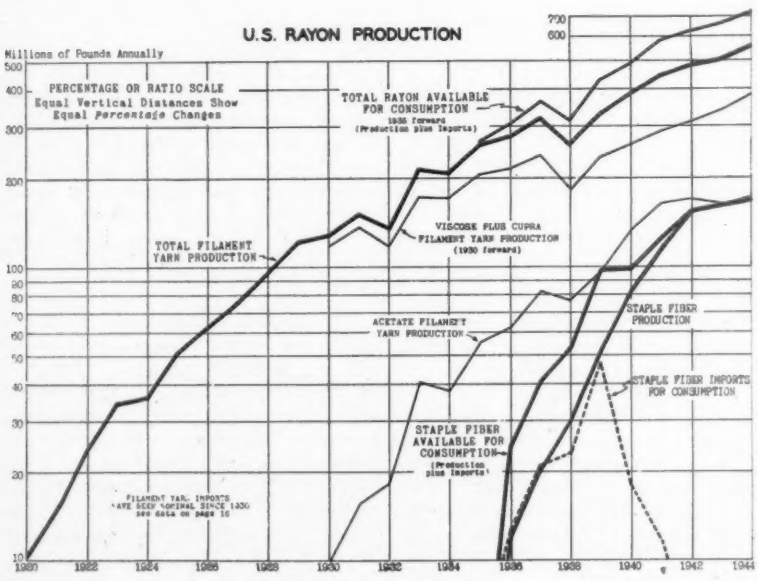
There are other important users of wood pulp in the rayon industry. The direct entry of St. Regis Paper Co. into the rayon industry in the past year was an important development. It took over as a subsidiary the Skenandoa Rayon Corp. at Utica, N. Y.

The American Viscose Corp., an important wood pulp user, recently announced purchase of a 741-acre tract near Radford, Va., where a new plant will be constructed for producing staple fiber at an annual rate of 55,000,000 pounds.

Courtauld's, Ltd., of Great Britain, announced plans for big rayon plants near Belfast, North Island near Dundee, Scotland, in Wales Australia and possibly India.

The rayon makers appear to have no immediate worries about competition from new or chemical textiles. Rayon is at present by far the cheapest chemical fiber and further reduction in costs probably will be made after the war. Rayon also has an annual market of around 600 million pounds, compared with a present production of around 25 million pounds for nylon.

It would take years to build enough plants to cut very heavily into this volume. Meanwhile, improvements in rayon have opened huge new potential markets in tire cord, carpets and other fields never exploited under peacetime conditions.



Latin American Rayon Industry Expands

● The rayon industry in Latin America, an important market for North American and Swedish pulp, is rapidly developing with a new rayon plant under construction in Peru and Mexico and expanion planned in Brazil and Argentina. Wood quality and supply in South America is favorable for pulp mill development in Brazil, and northwest Argentina. Mexico and Chilean interests hope to develop pulp timber.

According to a Department of Commerce report, Brazil was among the first countries to become interested in rayon. At first all raw materials were imported, but gradually the industry became more national in character. Wood pulp originally was imported from Scandinavia, but after this source was cut off more North American pulp was purchased. One large factory has introduced the use of cotton linters, which are plentiful in South America.

In 1939 Brazil had three rayon plants in the State of Sao Paulo. By 1942, there were five plants making more than 7,000,000 kilograms of yarn per year.

Rayon yarn was first produced on a commercial scale in Argentina in 1936, when acetate yarn was manufactured from imported cellulose acetate flake. A second factory began commercial prouction of viscose rayon yarn in 1937, importing wood pulp, linters and caustic soda. Carbon bisulphide and sulphuric acid were obtained from domestic sources.

Argentina, making over 3,500,000 kilograms of rayon per year by 1941, progressed from importing 60 per cent of its rayon yarn to producing approximately 80 per cent. Viscose yarns for women's hosiery must be imported because domestic firms do not manufacture the proper type.

September 1942 marked the beginning of rayon manufactures in Mexico, when a plant was established near Mexico City. It has an estimated capacity of 600,000 kilograms of 120-denier viscose rayon yarn per year. Approximately 500 workers are employed. A second plant is under construction at Poncitlan, Jalisco.

After many delays, Chile's very modern viscose-rayon factory began operation in September 1941. Technical difficulties and slow deliveries of raw materials retarded the performance, and the full production rate (60,000 kilograms annually) was not achieved until early 1944. Cellulose must be imported, but it is hoped that eventually native timber will be utilized.

A contract was let in 1944 for construction of Peru's first rayon plant, with potential capacity of 1,500,000 pounds (680,272 kilograms) of viscose yarn. Wood pulp is to be used because the domestic supply of cotton linters demands a higher price.

Columbia's only rayon plant began operations in 1939 and produced over 500,000 kilograms in 1942, using imported wood pulp.

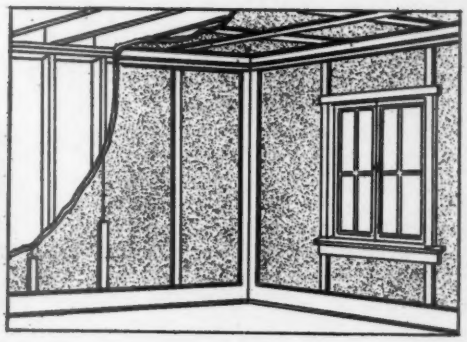
There have been reports of a pulp mill for Bolivia, but indications lately were that this project was dropped.

There are many rayon weaving and knitting mills throughout the Latin American nations, using imported rayon.

The DEFIBRATOR-CHEMIPULPER

IN SUCCESSFUL MILL OPERATION . . . PRODUCING PULPS FOR MANUFACTURE OF

BUILDING BOARD



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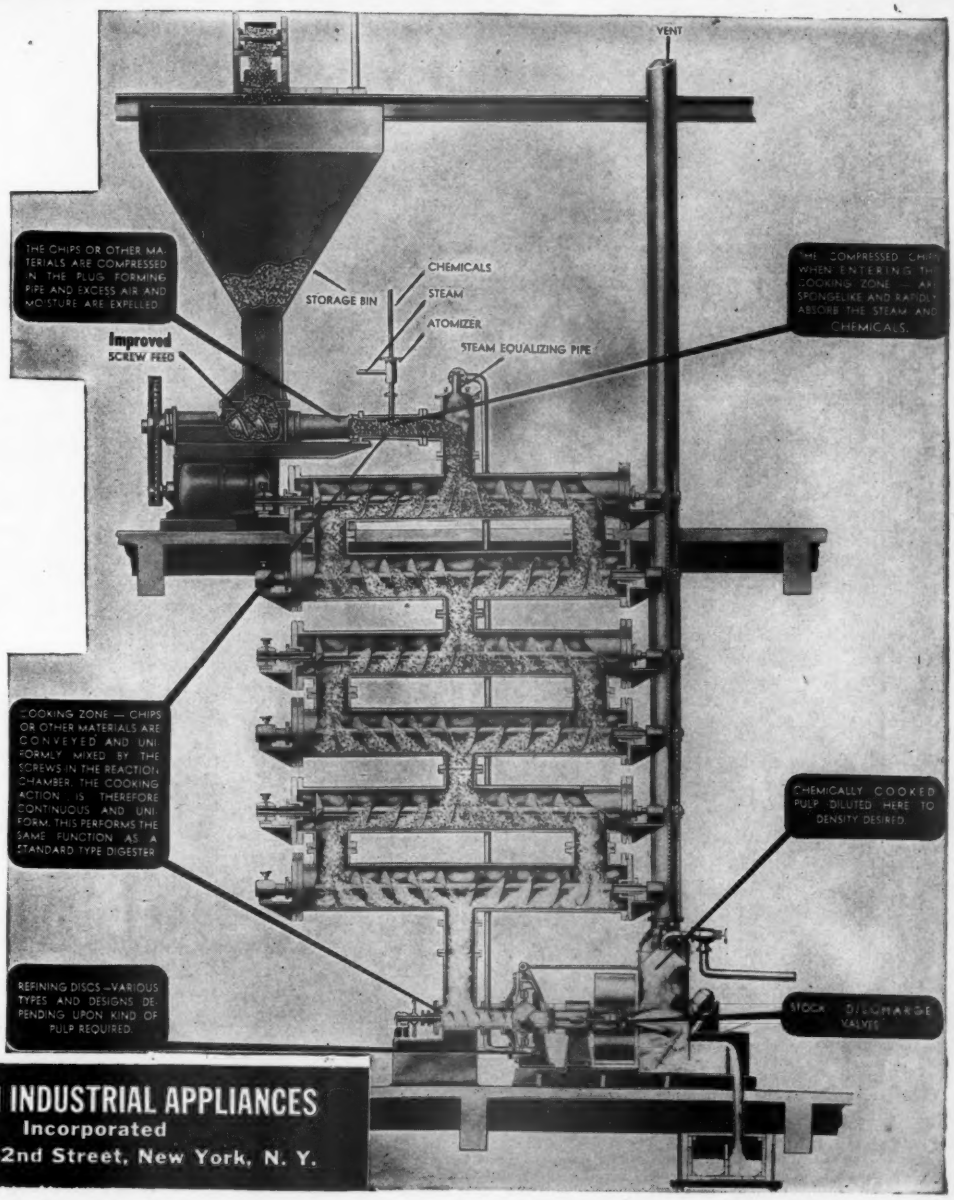
patented and patents pending.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THE CHIPS OR OTHER MATERIALS ARE COMPRESSED IN THE PLUG FORMING PIPE AND EXCESS AIR AND MOISTURE ARE EXPELLED
CHEMICALS
STEAM
ATOMIZER
STORAGE BIN
Improved SCREW FEED
STEAM EQUALIZING PIPE
THE COMPRESSED CHIPS WHEN ENTERING THE COOKING ZONE — ARE SPONGELIKE AND RAPIDLY ABSORB THE STEAM AND CHEMICALS.
COOKING ZONE — CHIPS OR OTHER MATERIALS ARE CONVEYED AND UNIFORMLY MIXED BY THE SCREWS IN THE REACTION CHAMBER. THE COOKING ACTION IS THEREFORE CONTINUOUS AND UNIFORM. THIS PERFORMS THE SAME FUNCTION AS A STANDARD TYPE DIGESTER
CHEMICALLY COOKED PULP DILUTED HERE TO DENSITY DESIRED
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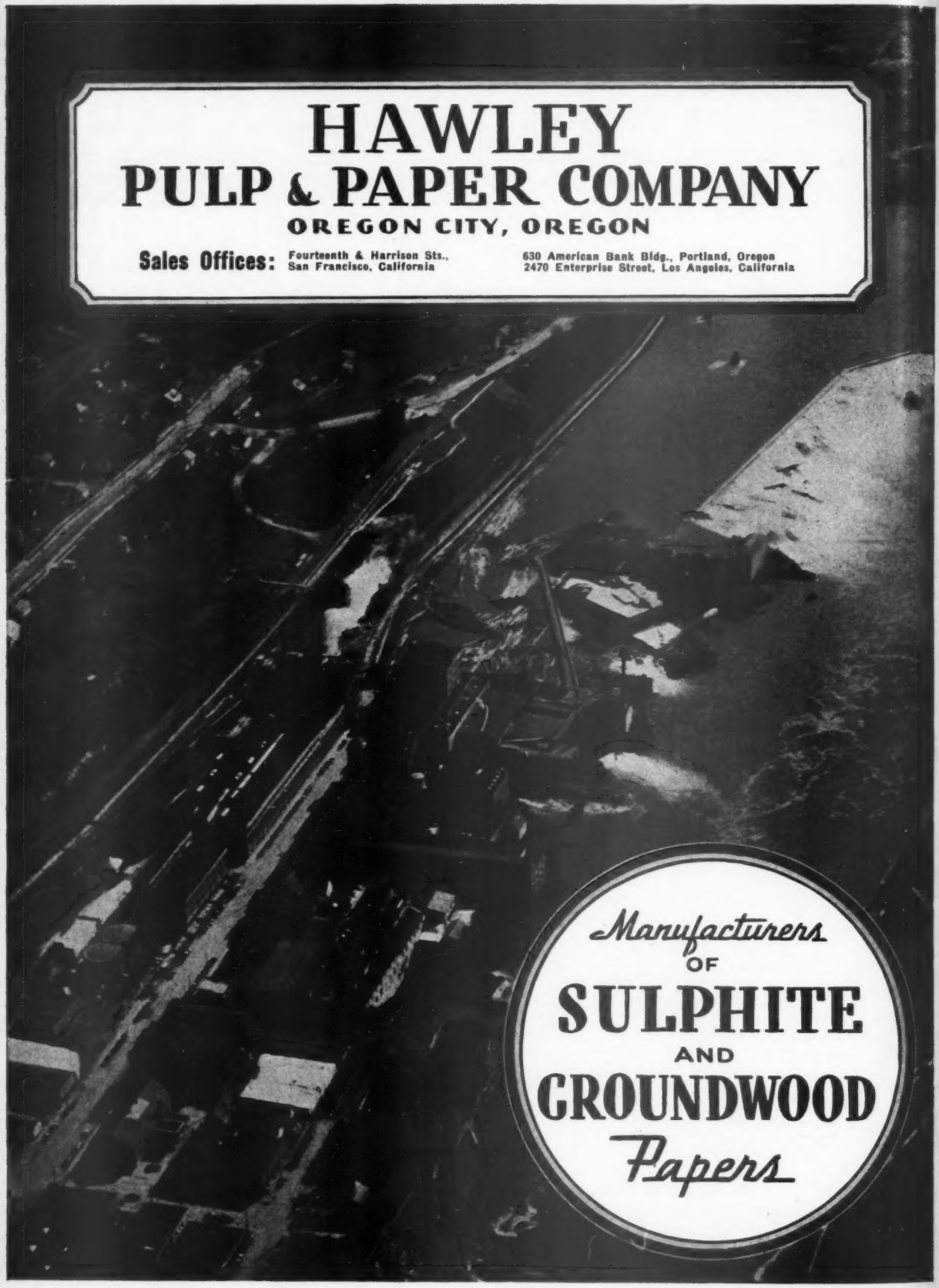


FORECASTING 1946-1947-1948

A Review of the Housley and Dept. of Commerce Predictions on Pulp and Paper Production

The rise in United States paper production to widely-heralded new high records is expected to begin during the latter half of 1945. The way was cleared for a steady upward surge in almost all grades of paper and board as the war in Europe ended. Swedish pulp imports and extensive releases of equipment and materials were bound to give the industry the greatest shot in the arm it has had in many years.

Early this year, PULP & PAPER INDUSTRY published two well-known forecasts.

The first one (Jan. 1945 issue) was written by Clifton W. Housley, statistician of the Forest Products Bureau, War Production Board, who at that time was serving in a similar capacity in the Paper Division of that bureau. Although disowned by the WPB, because of its policy against official prophecies, the Housley report nevertheless was based on long familiarity with information accumulated by the WPB.

The second forecast (Feb. 1945 issue) was an official Department of Commerce work—more comprehensive than its predecessor and based on much secret worldwide data, gathered by the State Department and Bureau of Foreign and Domestic Commerce, which had never before been revealed. Principal author was W. LeRoy Neubrech, chief, Pulp & Paper Unit, Bureau of Foreign and Domestic Commerce, and he was assisted by Charles W. Boyce and Donald Collier.

Much Interest Shown

Numerous requests were received by PULP & PAPER INDUSTRY for reprints of these reports.

Because of that interest and because we now know the years for which the authors made their predictions, we are presenting a combined review of the forecasts on these pages.

V-E Day was May 8—therefore, Mr. Housley's predictions of U. S. paper and pulp production and world pulp production were for 1947. The Department of Commerce report stipulated that if V-E Day fell within the first six or eight months of 1945, its worldwide forecasts were to be considered "reasonably sound" for the years 1946, 1947 and 1948.

On this page are comparisons of some of these predictions for the United States, with past records and with data on the potentiality of the industry presented by the U. S. Pulp Producers Assn. (Oliver M. Porter, executive director) and the American Paper and Pulp Assn. (E. W. Tinker, executive secretary).

The Housley Premises

Mr. Housley, in his forecast, said: "The return of the paper industry to the pursuit of supplying peacetime demand offers unprecedented possibilities, and a challenge, to the producers of paper and paper products. Free from

W. LEROY NEUBRECH (left) is Chief, Pulp & Paper Unit, Bureau of Foreign and Domestic Commerce, U. S. Dept. of Commerce. A New Yorker, he went West with Forest Service and South on Purdue research project before Washington assignment.

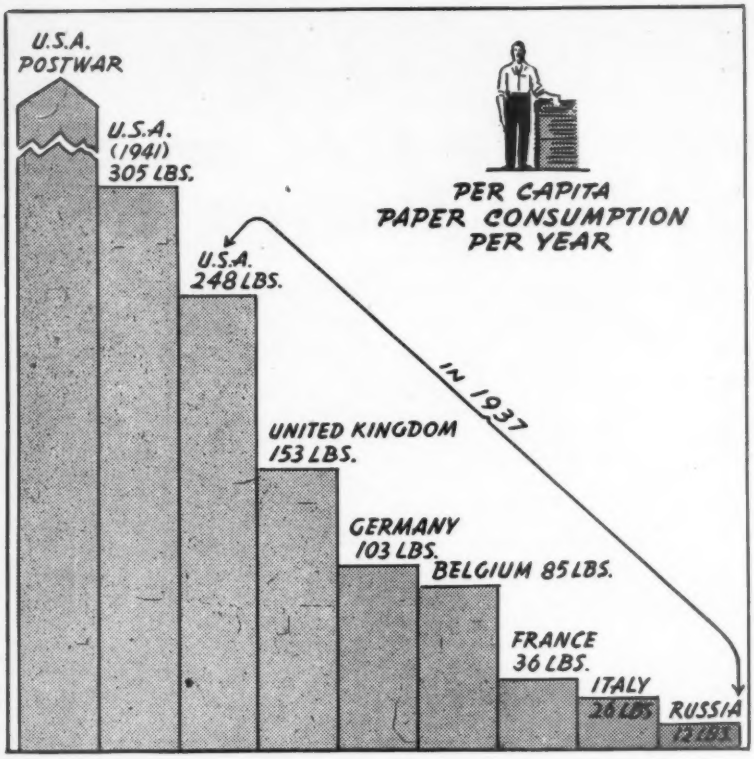
CLIFTON W. HOUSLEY (right) is Coordinator of Statistics, Forest Products Bureau, U. S. War Production Board. An Arkansan, he served with U. S. Tariff Commission, and State Dept., on trade agreements, and was WPB Paper Division Statistician, before present post.

U. S. PULP PRODUCTION

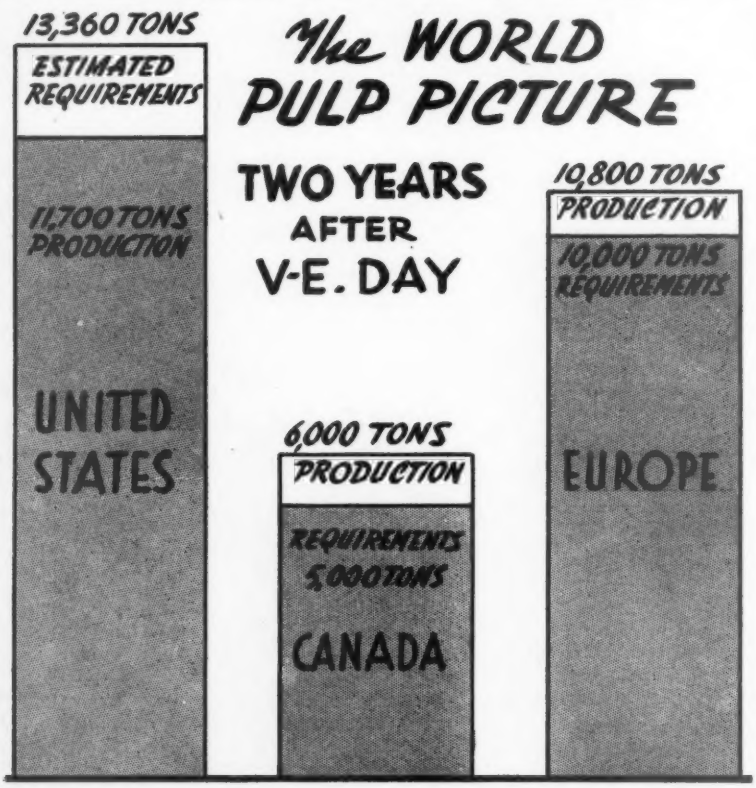
Forecasts:	Tons
Mr. Housley (for 1947)	11,700,000
Department of Commerce (1947)	11,244,000
Department of Commerce 1948)	11,694,000
Estimates of present capacity:	
Mr. Housley	12,790,000
U. S. Pulp Producers Assn.	10,986,000
Past records:	
High (1942)	10,227,720
Last year (1944)	9,387,456
Pre-war (1939)	6,993,334
Depression low (1932)	3,760,267
Pre-depression high (1929)	4,862,885

U. S. PAPER PRODUCTION

Forecasts:	Tons
Mr. Housley (for 1947)	20,070,000
Department of Commerce (1947)	19,221,000
Department of Commerce (1948)	19,157,000
E. W. Tinker, APPA (1947 potential)	18,740,000
Past records:	
High (1941)	17,762,365
Last year (1944)	17,182,804
Pre-war (1939)	13,509,642
Depression low (1932)	7,997,872
Pre-depression high (1929)	11,140,235



The above chart issued by the American Paper and Pulp Assn. indicates how very small increases in paper consumption in some countries could greatly increase paper demand. For example, if just one pound more of paper was used annually by each of Russia's 193,000,000 people. Latin America's consumption—not shown on the table—was only 13.7 pounds per capita in 1937.



—According to the Housley Report on "Postwar Paper and Paperboard Demand."

the restrictions of war controls, paper and paperboard production in this country points to a new high level which may well approach 20 million tons annually in the early postwar period. The achievement of this level of production is predicated on the assumption that there will be an adequate supply of raw material and labor, that there will be a continuing high level of industrial activity after the war, and that the paper industry itself will be fully prepared—production and distribution - wise — to meet the expanding demands for paper and paper products.

"The release of pent-up purchasing power for consumers' goods of all types will create a demand for paper mill products which has, as yet, been unapproached . . . In addition, there will be a sizeable foreign demand for book, business and industrial papers. . . ."

Pulp

His conclusions on the pulp situation in 1947 follows, in part:

"Assuming the demand for pulp in Europe is for 10 million tons, which is slightly higher than the 1935 level of 9.3 million tons, and that European production in that year will not exceed 10.8 million tons, the total surplus available for export to non-European countries will be about 800,000 tons. The foregoing estimate of European demand takes into consideration pulp requirements for the manufacture of paper and paperboard, rayon and other non-paper production, as well as the pulp needed to replenish inventories in the countries of Europe. If, however, inventories are substantially lower than have been estimated, the net exportable surplus of pulp from Europe will be less than the 800,000 tons indicated. United States pulp imports (in 1947) are not expected to exceed 500,000 tons annually. . . .

"The pulp required to produce a projected 20 million tons of paper in the United States, based on the 1st quarter 1944 pulp usage, amounts to about 12,860,000 tons. Assuming that domestic production can be increased to 11.7 million tons during the second year following V-E, and that imports from Canada remain at a one-million-ton-level, a minimum of 660,000 tons would be needed from European sources to augment domestic and Canadian pulp in supplying United States needs. In the event these quantities are not forthcoming from Canada or Europe, then pulp from domestic inventories will have to be used to meet the deficit required to produce the projected paper and paperboard tonnage.

Pulpwood

Concerning wood supply, Mr. Housley wrote:

"It will be necessary to increase substantially receipts of wood (from both Canadian and domestic sources) over the present level of 17,400,000 cords per year. The previous high record was in 1942, when wood receipts totalled 16,700,000 cords for the year. The production of 11.7 million tons of pulp would require about 19.3 million cords of wood. In meeting future pulpwood needs it is believed domestic mills will

use considerably larger quantities of hardwood, as well as species of wood which have not been in general use heretofore. Moreover, it will be necessary to utilize larger quantities of wood waste and at the same time intensify research in developing improved yields of pulp."

Other Assumptions

He set forth these further "assumptions" as a basis for his forecast:

"That there will be a high level of industrial activity in the immediate postwar years with an accompanying high level of national income, probably at a level of 125 billion dollars annually.

"That sufficient labor will be released from the armed services and war industries to permit higher operations.

"That with adequate labor, larger quantities of pulpwood will be produced and thus permit a larger production of pulp, paper, and paperboard.

"The bulk of the Scandinavian pulp will be needed to supply European demands in the immediate postwar years . . .

"That production facilities in the pulp mills and paper mills will be increased sufficiently to meet the production level projected."

Housley Predictions of U. S. Production for 1947

Grade	Thousands of Tons	Thousands of Tons of Pulp Required
Total paper & paperboard	20,070	12,860
Total paper	10,790	9,060
Newsprint	850	890
Grdwd., book & fine	4,300	3,312
Course & ship. sack	3,240	3,298
Special ind. & abosrb.	300	257
Sanitary & tissue	1,100	1,109
Building papers	1,000	194
Total paperboard	9,280	3,800
Container bd.	4,300	2,421
Folding & setup bxbd.	3,300	596
Building board	1,000	602
Miscelleanous (including cardboard)	680	181

Dept. of Commerce Forecast

The tables on world production and consumption needs and estimates of world surpluses and deficits on these pages are from the "World Pulp and Paper Forecast" by the State Department.

Regarding world pulp and paper production and consumption, this report said:

"A tight market in paper and pulp could easily continue for three years following the close of the European war, both in the United States and the world.

"The estimated world production of paper (in 1946) will be below world consumption needs by an estimated 1,027,000 short tons. In the second postwar year the analysis of world conditions indicates the production of paper will be greater than consumption needs, with an apparent surplus of 1,011,000 tons; in (1948) world production is

U. S. DEPARTMENT OF COMMERCE FORECAST OF PRODUCTION AND CONSUMPTION NEEDS OF SEVEN REGIONS OF THE WORLD

	Percent of World Production		Percent of World Consumption Needs		Percent Production Greater or less than Consumption Needs	
	Paper	Pulp	Paper	Pulp	Paper	Pulp
(United Kingdom-France-Low Countries-Denmark)						
1937	15.2	2.8	18.8	14.4	— 18.1	— 80.3
1946	9.3	1.0	9.7	8.4	— 7.5	— 87.9
1947	10.2	1.4	11.8	10.2	— 11.4	— 85.9
1948	11.5	2.3	13.7	11.2	— 15.2	— 79.5
(Sweden-Norway-Finland)						
1937	7.1	26.5	2.2	8.5	+236.9	+215.6
1946	5.4	20.4	1.5	6.8	+253.1	+206.7
1947	6.0	21.9	1.7	7.8	+262.0	+183.0
1948	6.6	22.4	1.9	8.2	+242.0	+173.4
(Germany-Italy-Poland-Austria-Czechoslovakia)						
1937	16.0	14.9	14.3	14.9	+ 14.1	+ 4.5
1946	6.5	5.8	4.5	6.6	+ 40.7	— 9.9
1947	7.5	6.8	6.2	7.2	+ 24.7	— 5.2
1948	8.4	7.5	6.9	7.9	+ 23.2	— 4.3
(Russia-Baltic [Except Finland] and Balkan States-Spain-Portugal-Switzerland)						
1937	4.8	6.7	5.0	5.6	— 2.8	+ 19.7
1946	2.5	2.8	3.9	3.0	— 37.4	— 3.5
1947	3.2	3.3	4.7	3.8	— 29.8	— 12.8
1948	4.2	4.1	4.9	4.9	— 12.1	— 17.0
(Latin American Countries)						
1937	1.0	0.1	2.6	0.9	— 59.1	— 93.2
1946	1.8	0.3	4.0	1.6	— 56.5	— 78.4
1947	2.0	0.4	4.4	1.7	— 54.1	— 78.1
1948	2.0	0.4	4.5	1.7	— 55.4	— 76.8
(Canada-Newfoundland)						
1937	13.9	20.6	2.8	17.5	+408.1	+ 18.4
1946	14.1	22.9	3.2	18.3	+319.5	+ 27.5
1947	13.5	21.9	3.5	17.6	+304.2	+ 24.9
1948	13.4	20.9	3.4	17.0	+291.4	+ 23.6
(Asia [Except Russia]-Australia-New Zealand)						
1937	3.8	3.7	6.4	6.1	— 39.1	— 38.3
1946	2.4	3.0	5.0	3.4	— 54.4	— 9.5
1947	2.0	1.7	5.0	2.6	— 59.1	— 34.0
1948	2.1	1.8	5.3	2.7	— 61.0	— 33.9

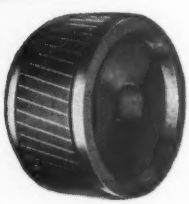
Estimated World Paper and Wood Pulp Surplus (+) or Deficit (-)

(1,000 short tons)

Year	Total for the world	World - other than the United States	United States
	Paper and Paperboard		
1937	+ 532	+ 3,624	- 3,092
V-E 1	- 1,027	+ 2,884	- 3,911
V-E 2	+ 1,011	+ 2,819	- 1,808
V-E 3	+ 330	+ 2,904	- 2,574
	Wood Pulp		
1937	+ 163	+ 2,078	- 1,915
V-E 1	+ 526	+ 2,246	- 1,720
V-E 2	+ 124	+ 1,762	- 1,638
V-E 3	+ 113	+ 1,708	- 1,595

Note: The surplus or deficit is calculated by relating production to consumption needs prior to export or import. When production is greater than consumption needs, the difference is considered to be a surplus (+). When production is less than consumption needs, the difference is considered to be a deficit (-).

The Only Motor with a *Copperspun* ROTOR



Only in Fairbanks-Morse Motors will you find rotors centrifugally cast in *one piece*—and of *copper!*

The characteristics of copper make it the ideal rotor material. Copper has high electrical and thermal conductivity (twice as good as aluminum), greater strength, and low thermal expansion.

The indestructible copperspun rotor, with its better electrical characteristics, puts the new Fairbanks-Morse Motor far ahead of the times in stamina, in protection, and in versatility.

See a demonstration of what this motor can do for you. Write Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago 5, Illinois.

Every Good Feature You Could Ask!

Protected Frame—Excludes dripping liquids and falling particles.

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Ball Bearings—Sealed in and protected.

Recessed Conduit Box—An innovation for neat installations in close quarters. Conventional box also provided.

Adaptability—Frame gives protection in any mounting position because the vented bearing brackets can be turned to four positions 90° apart. Reversible frame permits locating conduit box on either side.

Balanced Characteristics—A 40°C. motor with high efficiency and power factor, and excellent starting and accelerating torques.

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Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines • Generators • Motors • Pumps • Scales
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expected again to be greater than consumption needs by 330,000 tons. (In no year would the deficit or surplus be greater than 3% of production.)

"The anticipated world paper deficit in (1946) is accounted for principally by continued heavy military demands, particularly by the U. S. to carry on the war with Japan, coupled with rising consumption needs in many countries.

"In (1947) an apparent world surplus is brought about by a somewhat enlarged world production of paper accompanied by a substantial reduction in paper needs for military purposes. The U. S. paper consumption needs in (1947) are estimated at about 1,500,000 tons less than in the first postwar year, while consumption needs in other countries throughout the world will have increased by approximately 2,000,000 tons, but at the same time world production will have risen about 2,600,000 tons.

Pulp Production

"World wood pulp production in the first three years after V-E Day will be in approximate balance with consumption needs, according to expectations as set forth in this report, with indications of moderate surpluses. The world's production of wood pulp (in 1946), including pulp now in storage in Sweden, is estimated at 24,348,000 tons compared with estimated consumption needs of 23,822,000 tons, indicating a surplus of 526,000 tons. . . . For (1947) this surplus is estimated at 124,000 tons and for the third year at 113,000 tons.

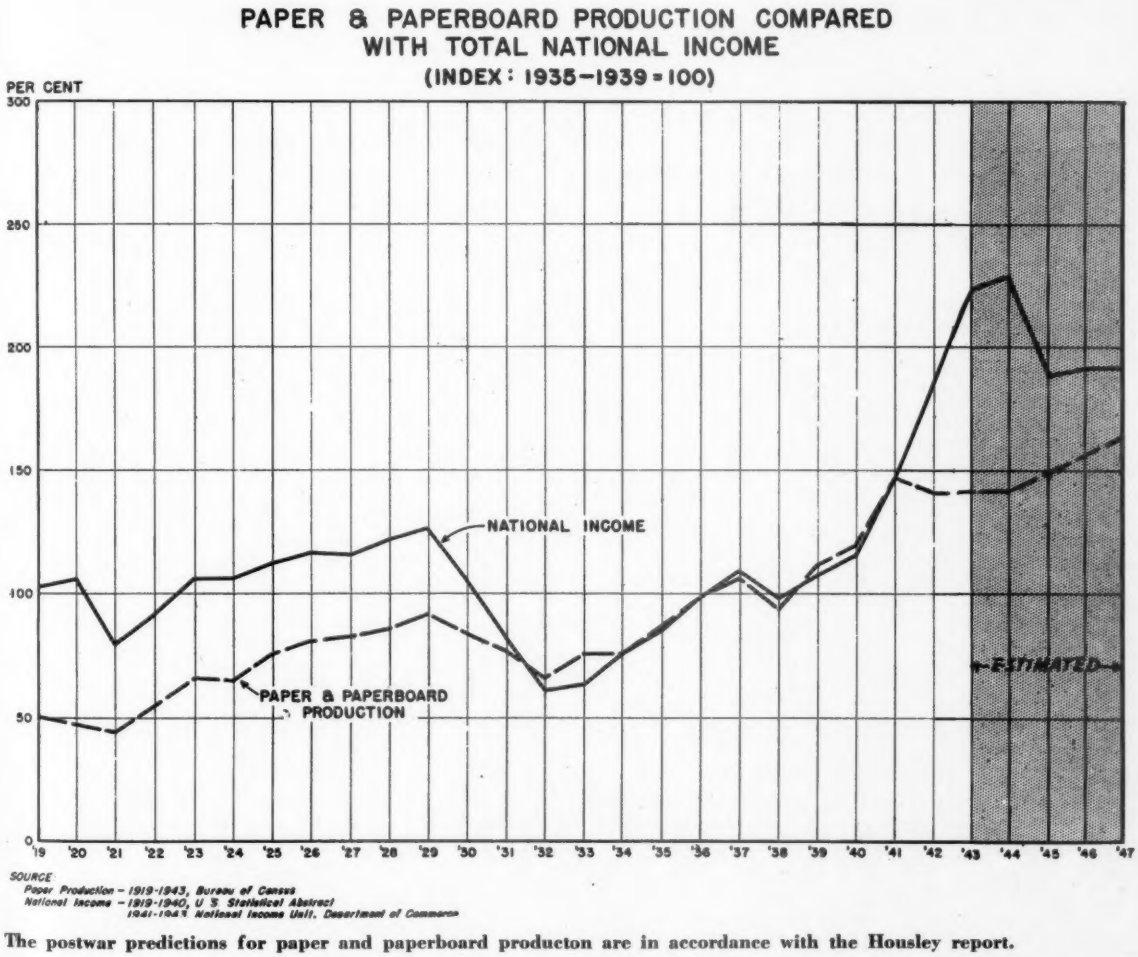
"Production of wood pulp in the Northern European countries (in 1946) is estimated at 4,377,000 tons, to which may be added 600,000 tons to Swedish pulp in storage (now near 800,000 tons) making a total of 4,977,000 tons. Of this amount, it is estimated that a surplus over and above consumption needs of 3,354,000 tons will be available for export to other consuming countries. This compares with a 4,832,000-ton surplus in 1937. Estimates for (1947) disclose that the Northern European contries will have 3,728,000 tons for export and for (1948) an export surplus of 4,074,000 tons.

"If the U. S. is to meet its consumption needs for pulp (in 1946) it is estimated that 1,995,000 tons will have to be imported from foreign sources. This allows for exports of 275,000 tons which must be equalized by an equivalent amount of imports in addition to the net deficit between production and consumption needs. Imports in 1937 were 2,395,000 tons. For (1947) the U. S. will need 1,938,000 tons of foreign pulp and in (1948) 1,920,000 tons, allowing for U. S. exports, if near-capacity operations are achieved by the domestic industry. It is thereby indicated that U. S. dependence upon foreign supplies (in 1947 and 1948) may be somewhat less than imports in most years immediately preceding 1940.

U. S. Requirements

"A similar over-all situation for the U. S. is indicated with regard to paper and paperboard; the apparent deficit in production compared with consumption needs for (1946) is 3,911,000 tons; for (1947) the deficit totals 1,808,000 tons; and for (1948) the deficit is indicated at 2,574,000 tons. The gross import needs would be larger to an extent equal to U. S. paper exports in these years. At present there is no reason to believe that imports of newsprint in approximate prewar volume will be reduced by a substantially greater postwar domestic output.

"The U. S. consumption needs for paper in the first year after the European war, which will include 4,369,999 tons for military uses, is estimated at 22,522,000 tons, amounting to 68% of expected world consumption needs. The estimated domestic production of paper is 18,611,000 tons, which represents nearly full operation at anticipated practical operating capacity. The net U. S. defi-


PAPER & PAPERBOARD PRODUCTION COMPARED
WITH TOTAL NATIONAL INCOME
(INDEX: 1935–1939 = 100)
PER CENT
300
250
200
150
100
50
0
NATIONAL INCOME
PAPER & PAPERBOARD PRODUCTION
ESTIMATED
'19 '20 '21 '22 '23 '24 '25 '26 '27 '28 '29 '30 '31 '32 '33 '34 '35 '36 '37 '38 '39 '40 '41 '42 '43 '44 '45 '46 '47
SOURCE:
Paper Production – 1919-1943, Bureau of Census
National Income – 1919-1940, U S Statistical Abstract
1941-1943 National Income Unit, Department of Commerce

The postwar predictions for paper and paperboard producton are in accordance with the Housley report.

cit is thereby indicated at 3,911,000 tons whereas the surplus available from other world countries is 2,884,000 tons, leaving an apparent world shortage of 1,027,000 tons.

"In (1947 and 1948) both the consumption needs and production of paper in large European paper consuming countries will increase substantially. U. S. and Canadian output of paper will also increase. But U. S. consumption needs will decrease as the necessity for military uses diminishes. These shifts bring about an estimated world surplus of paper amounting to slightly over 1,000,000 tons in (1947) and 330,000 tons in (1948). This rapid balancing of paper production and consumption needs in the world is contingent, however, upon maintaining maximum production in all producing countries to the limit of available resources and operable facilities."

The Department of Commerce report then went into a detailed discussion of the condition of the industry in all regions of the world outside of the U. S., presenting the background for the "Forecast of Production and Consumption Needs of Seven Regions of the World," which appears with this article.

This was followed by U. S. estimates, in which the report analyzed the U. S. pulp production possibilities. It said:

"It is possible to arrive at a fairly reliable index of practical operating capacity by adding the rated or actual capacity of the facilities added after 1942 to the actual production records established during the first 6 months of 1942, a period in which labor, materials, and transportation were adequate and prices were favorable. This sum amounts to 11,244,000 tons of annual operating capacity in wood pulp on V-E Day."

In 1946, the report said, "the backward trek of labor from war production plants and from military service will gradually augment the labor supply for the industry. It is assumed that two years will be required to bring wood pulp production to this capacity and that about half of idle capacity as of V-E Day will be brought into production in (1946). Wood pulp production in (1946) is estimated at 10,658,000 tons.

"In (1947) there will be further improvements and expansion in going concerns. There will likewise be eliminations. It is assumed that these procsses will offset each other during the first two postwar years. Maximum U. S. wood pulp production in (1947) is estimated at 11,244,000 tons."

The report said 1948 would be "the first year in which a net increase in wood pulp operating capacity of substantial proportions can be expected. How much this will be is difficult to estimate, especially in the case of market pulp for here numerous economic and political problems are involved, the solution of which may swing wood pulp production either up or down. A net increase of 450,000 tons in practical operating capacity is set up. This results in an estimate of U. S. wood pulp production in (1948) of 11,694,000 tons."

U. S. Paper Output

The Department of Commerce report also presented a table on estimated U. S. paper production for three years after V-E Day, compared with a realistic estimate of domestic and export needs to be met from U. S. production. This follows:

DEPARTMENT OF COMMERCE FORECAST

PAPER AND PAPERBOARD: WORLD PRODUCTION COMPARED WITH CONSUMPTION NEEDS, BY GEOGRAPHICAL AREAS

(1,000 short tons)

1) World areas	Production				Consumption needs				Production greater (+) or less (-) than consumption needs			
	1937	V-E-1	V-E-2	V-E-3	2) 1937	V-E-1	V-E-2	V-E-3	1937	V-E-1	V-E-2	V-E-3
Total for the world	13,727	32,061	34,604	36,947	33,195	33,066	33,593	36,617	+ 532	- 1,027	+ 1,011	+ 330
United States (total)	12,837	18,611	19,221	19,157	15,929	22,522	21,029	21,731	- 3,092	- 3,911	- 1,808	- 2,574
World other than the United States (total)	20,890	13,450	15,383	17,790	17,266	10,566	12,564	14,886	+ 3,624	+ 2,884	+ 2,819	+ 2,904
Europe	14,560	7,599	9,323	11,356	13,377	6,489	8,227	10,035	+ 1,183	+ 1,110	+ 1,096	+ 1,321
Northern	2,409	1,723	2,078	2,425	715	488	574	709	+ 1,694	+ 1,235	+ 1,504	+ 1,716
Western	5,118	2,973	3,541	4,256	6,251	3,213	3,997	5,020	- 1,133	- 240	- 456	- 764
Central & Eastern	5,411	2,086	2,604	3,106	4,743	1,483	2,088	2,521	+ 668	+ 603	+ 516	+ 585
Other Europe	1,622	817	1,100	1,569	1,668	1,305	1,568	1,785	- 46	- 488	- 468	- 216
Other American Republics	349	579	685	728	854	1,332	1,491	1,632	- 505	- 753	- 806	- 904
Canada and Newfoundland	4,695	4,510	4,685	4,944	924	1,075	1,159	1,263	+ 3,771	+ 3,435	+ 3,526	+ 3,681
Other World countries	1,286	762	690	762	2,111	1,670	1,687	1,956	- 825	- 908	- 997	- 1,194

Other World countries	1,286	762	690	762	2,111	1,670	1,687	1,956	- 825	- 908	- 997	- 1,194

WOOD PULP: WORLD PRODUCTION COMPARED WITH CONSUMPTION NEEDS, BY GEOGRAPHICAL AREAS

(1,000 short tons)

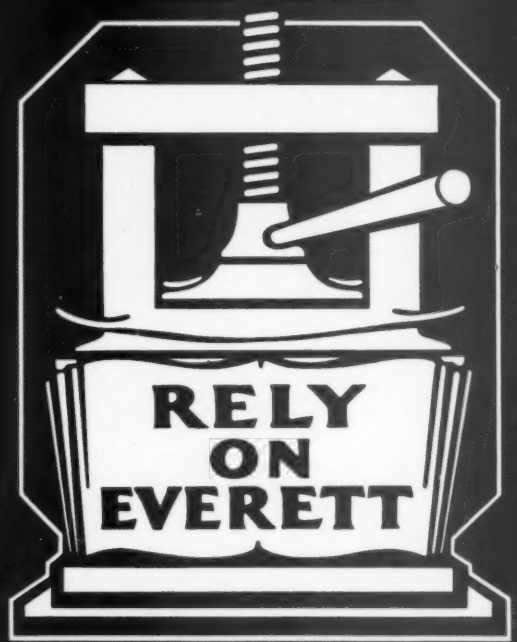
	Production				Consumption needs				Production greater (+) or less (-) than consumption needs			
1) World areas	1937	VE-1	VE-2	VE-3	2) 1937	VE-1	VE-2	VE-3	1937	VE-1	VE-2	VE-3
Total for the world	26,665	24,348	26,365	28,737	26,502	23,822	26,241	28,624	+ 163	+ 526	+ 124	+ 113
United States (Total)	6,573	10,658	11,244	11,694	8,488	12,378	12,882	13,289	- 1,915	- 1,720	- 1,638	- 1,595
World other than the United States (Total)	20,092	3) 13,690	15,121	17,043	18,014	3) 11,444	13,359	15,335	+ 2,078	+ 2,246	+ 1,762	+ 1,708
Europe	13,588	3) 7,309	8,807	10,408	11,512	3) 5,885	7,609	9,218	+ 2,076	+ 1,424	+ 1,198	+ 1,190
Northern	7,073	3) 4,977	5,765	6,424	2,241	3) 1,623	2,037	2,350	+ 4,832	+ 3,354	+ 3,728	+ 4,074
Western	755	240	377	657	3,826	1,990	2,681	3,204	- 3,071	- 1,750	- 2,304	- 2,547
Central & Eastern	3,971	1,406	1,793	2,152	3,950	1,561	1,891	2,249	+ 21	- 155	- 98	- 97
Other Europe	1,789	686	872	1,175	1,495	711	1,000	1,415	+ 294	- 25	- 128	- 240
Other American Republics	17	84	99	112	251	388	453	483	- 234	- 304	- 354	- 371
Canada and Newfoundland	5,494	5,569	5,764	6,017	4,641	4,367	4,614	4,868	+ 853	+ 1,202	+ 1,150	+ 1,149
Other World countries	993	728	451	506	1,610	804	683	766	- 617	- 76	- 232	- 260

1) The major wood pulp and paper producing and consuming countries of the world, with the exception of the United States have been grouped for purpose of this report as follows:
United States.
Northern Europe - Finland, Norway and Sweden. The Karelian Isthmus, formerly a part of Finland, has been included for all periods with the group "Other European countries".
Western Europe - Belgium, Denmark, France, Netherlands and United Kingdom.
Central and Eastern Europe - Austria, Czechoslovakia, Germany, Italy and Poland.
Other European countries - Bulgaria, Estonia, Greece, the Karelian Isthmus, Latvia, Lithunia, Portugal, Spain Switzerland, Turkey, Union of Soviet Socialist Republics and Yugoslavia.
Other American Republics - Includes all the Republics of Central America, South America and the West Indies.
Canada and Newfoundland
Other world countries - Australia, British India, China, Japan, Netherlands Indies, New Zealand, Philippine Islands and Union of South Africa.

2) Apparent consumption (production plus imports less exports).

3) This includes 600,000 tons of Swedish pulp in stock on VE-Day awaiting shipment.

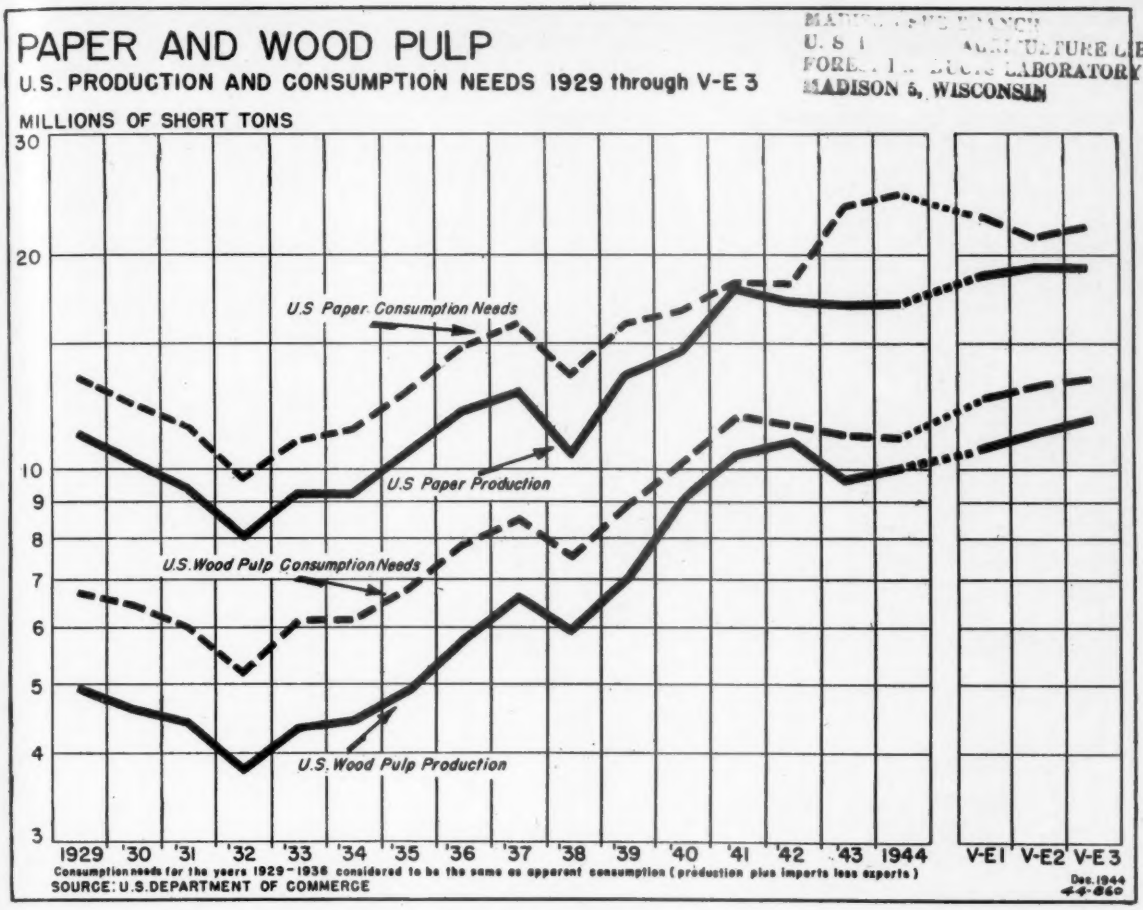
A symbol to guide your buying when paper returns from war



EVERETT PULP & PAPER CO.

EVERETT, WASHINGTON

U. S. AGRICULTURE LIBRARY
FOREST PRODUCTS LABORATORY
MADISON 5, WISCONSIN



U. S. CONSUMPTION NEEDS—The basis for estimating United States consumption needs of paper was established by relating apparent consumption of paper (production plus imports less exports) for the years 1929 to 1939 to the non-durable goods segment of the gross national product. The relationship established during this period is expressed by the regression equation $y = a + bx$, where (y) equals the consumption need and (x) equals the non-durable goods segment of gross national product in 1940 prices.

The year 1939 represents the last year in which apparent consumption can be considered equal to "consumption needs" (for civilian use), for in the following years apparent consumption includes military needs. It is, therefore, necessary to estimate the civilian and military needs separately. Paper mill reports to the War Production Board for the third quarter of 1943 and the first 6 months of 1944, which showed expected paper shipments by end-user groups, were used as a basis for determining the relationship between total dollar military expenditures and tonnage military paper needs.

United States estimates for the non-durable goods segment of gross national product, used as a basis to determine consumption needs, were supplied by the Business Statistics Unit. These estimates employ the same assumptions used throughout this report. They assume an unemployment volume of 5 to 6 million. Furthermore, they indicate that industrial activity in the V-E years will be about 21% above the 1939 level.

Estimates of both civilian and military consumption needs were made in terms of pre-war basis weights, use practices and pre-war ratios of fiber content.

Wartime shortages of paper for civilian uses were offset to a considerable extent by inventory withdrawals. To bring over-all inventories in the grades which are usually stocked to a reasonable level by the end of V-E 3, 200,000 tons have been added to consumption needs in V-E 1, 400,000 tons in V-E 2 and 600,000 tons in V-E 3 as shown in Table V.

U. S. Paper Production
(In Thousands of Tons)

Year	Production	Needs	Greater or less than Needs
1946	18,611	20,117	—1,506
1947	19,221	18,478	+ 743
1948	19,157	18,930	+ 227

Commenting on these figures, it said: "They show that in (1946) even if our productive facilities run at a maximum speed, they will produce about 1½ million tons less than we should produce. In (1947) they indicate that if the productive machine runs at capacity, it will produce a little more than we really need, and the same is true of (1948), but at a decreasing rate. The significant point is that we are going to utilize our paper productive facilities at maximum rates and that the margin of excess paper productive capacity is so small as to place the U. S. in a difficult position."

Beyond 1948

In regard to the future, the report said that in the next decade per capita consumption of paper in several countries could well approach the U. S. figures of more than 300 tons per person (most countries are far below this, many being in the 12 to 60 tons category).

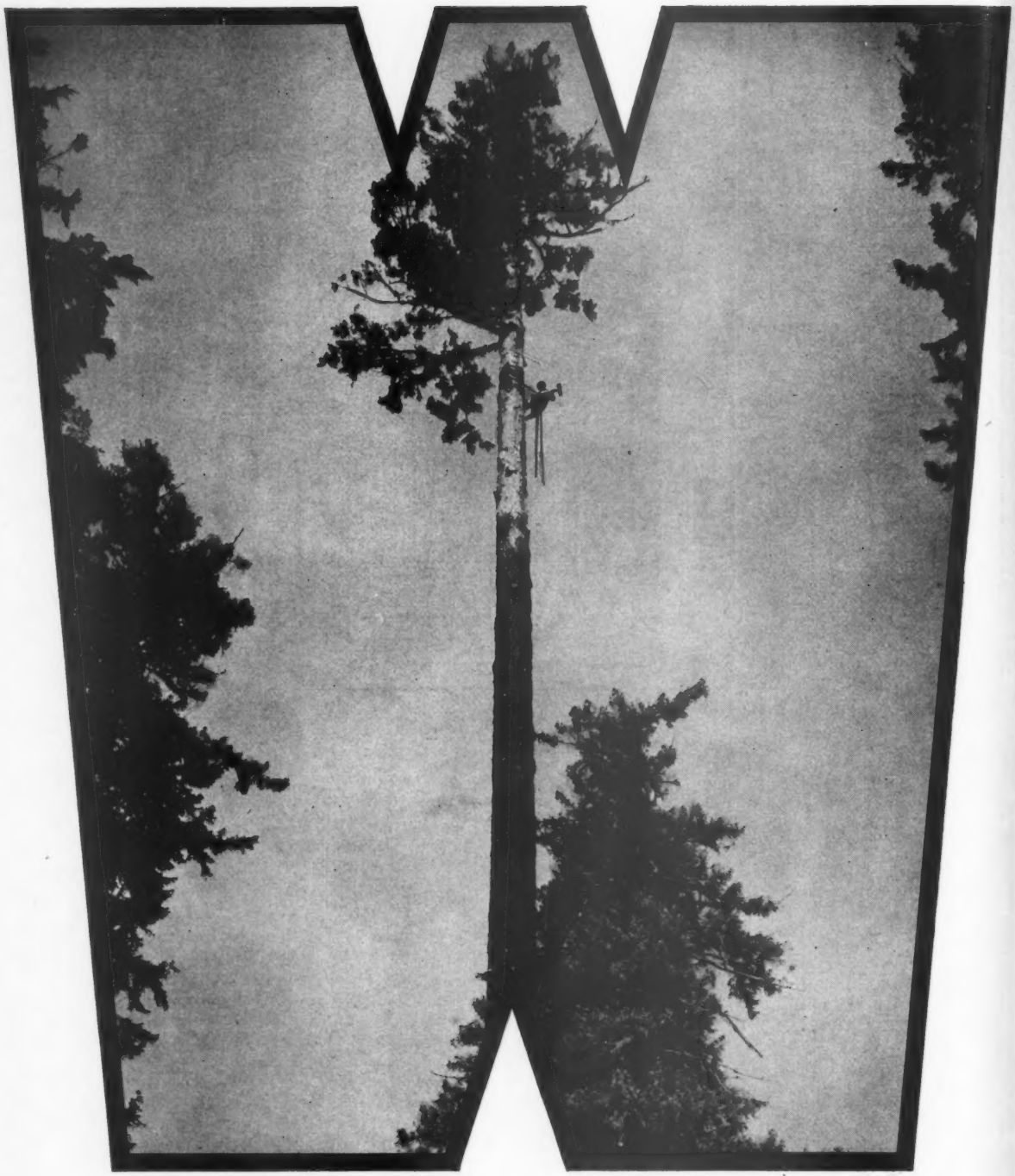
Looking beyond 1948, the report said "increased wood pulp production in terms of millions of tons will be needed" and that present indications are the bulk of this supply will come from U. S., Alaska, Canada and Soviet Russia.

NO NEED TO DESPAIR

THE World's Paper Trade Review of London, one of our faithful readers apparently, as we are of them, in a recent issue quotes from this magazine's recent article on whether the United States may retain the Australia-New Zealand parchment paper market after the war.

In our article, we in turn, had quoted from the London magazine—a very interesting journal—to the effect that British paper industry meeting had heard one of its members bemoan the wartime loss of that market to the U. S. industry. What we had to add was an interview with an American parchment industry leader, who said the British spokesman was too pessimistic and that the Australian-New Zealand market would undoubtedly shape up entirely differently after the war. A great deal would depend on postwar trade agreements made by the U. S. State Department. No doubt, British hopes for regaining their lost market will be revived.

WEST COAST HEMLOCK PULP



THE HIGH CLIMBER has the job of topping and then helping to rig spar trees, which have been chosen to support the steel cables that are the life-lines of West Coast logging.

PULP DIVISION ‡ WEYERHAEUSER TIMBER COMPANY

PAYROLLS and EMPLOYMENT-- South's Differential Disappears; Labor Costs Rise in U. S. and Canada

PAYROLLS and employment in the North American pulp and paper industry are substantially higher than the average for non-durable goods industries. They are steadier, by a substantial margin, than a long list of other industries. And they are of proportionately more vital importance to their communities than most other industries.

To explain this last point—about half of the United States pulp and paper industry's investment is in towns wholly or largely dependent on the pulp and paper mills located in those communities. In Canada, the proportion is unquestionably much higher.

D. K. Brown, president of the American Paper & Pulp Assn., has aptly called this a "Main Street" or "Home Town" industry. The trends in world trade, political pressures on the industry, etc., are felt more sharply, because of this fact. Fifty-eight per cent of U. S. mills are in communities with a population of less than 10,000 and the largest percentage of the primary industry is in communities estimated to be from 70 to 100 per cent dependent on the mills.

In virtually all regions of U. S. and Canada, the labor relations in the pulp and paper industry are pleasant, peaceful and progressive

UNITED STATES PAYROLLS

Average Hourly Earnings in Cents of Productive Employees (Exclusive of Converting Employees) in Pulp and Paper Manufacturing.

Source: Calculated from tables received from A.P.P.A.)

	June to December Inclusive							
	1937	1938	1939	1940	1941	1942	1943	1944
Pacific Coast	79.7	79.6	79.8	83.8	97.7	106.9	114.7	118.6
Other Regions	62.3	61.3	61.6	65.0	72.6	81.2	86.5	88.9
New England	62.4	60.8	61.2	64.0	71.5	79.3	84.0	86.5
Middle Atlantic	65.0	63.9	64.3	67.6	76.2	85.2	89.4	91.9
Lake States	65.2	65.0	65.6	68.0	74.7	82.1	86.0	89.1
Central (North)	61.7	62.6	62.4	64.4	71.9	78.7	83.1	86.0
Central (South)	55.9	54.9	55.1	59.5	66.5	76.2	79.5	83.2
Southern (East)	56.9	57.3	55.9	61.7	74.0	84.2	86.0	92.7

Average Weekly Earnings of Productive Employees (Exclusive of Converting Employees) in Pulp and Paper Manufacturing.

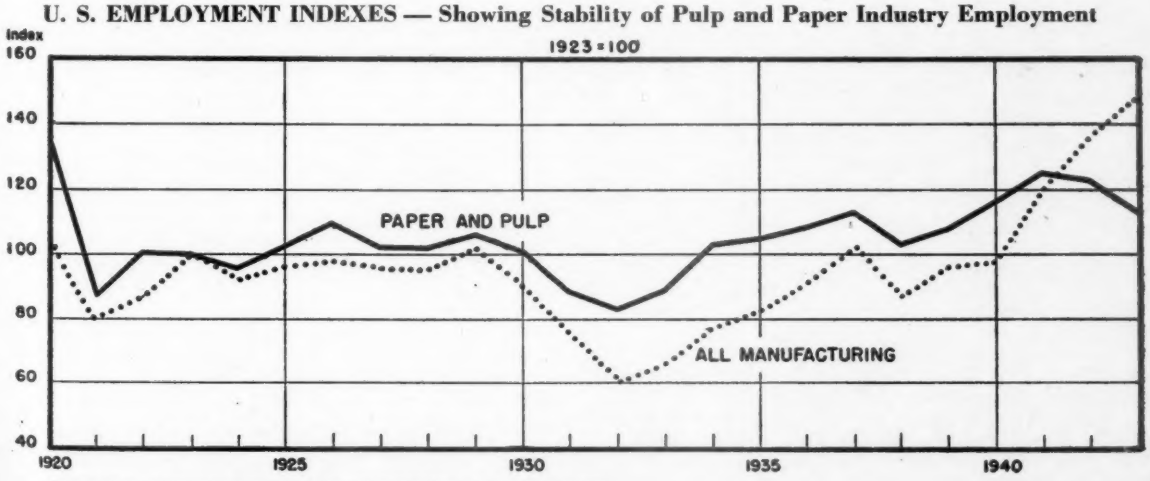
(Source: Calculated from tables received from A.P.P.A.)

	June to December Inclusive							
	1937	1938	1939	1940	1941	1942	1943	1944
Pacific Coast	$29.60	$26.49	$30.12	$32.33	$36.54	$43.71	$50.40	$51.66
Other Regions	23.85	23.19	24.65	26.11	30.23	33.55	38.27	41.70
New England	23.88	22.39	24.27	24.35	29.78	32.63	38.59	41.21
Middle Atlantic	24.72	24.04	26.74	26.29	31.97	35.84	41.11	43.44
Lake States	25.79	25.17	26.62	27.52	31.18	34.15	39.15	41.48
Central (North)	23.65	23.41	25.23	26.03	31.04	31.73	37.19	40.05
Central (South)	21.09	20.79	21.85	23.25	27.22	30.34	34.32	37.42
Southern (East)	20.98	21.39	21.82	24.52	28.88	34.71	38.43	43.68

CANADIAN PAYROLLS AND EMPLOYMENT

	1942		1943	
	Payroll	No. Employed	Payroll	No. Employed
Quebec	$32,715,297	18,496	$33,245,158	18,118
Ontario	21,801,085	11,134	22,260,167	11,002
British Columbia	7,618,433	4,261	8,159,504	3,867
Other Provinces	7,521,578	4,360	7,534,593	4,033
Total	$69,656,393	38,251	$71,199,422	37,020

U. S. EMPLOYMENT INDEXES — Showing Stability of Pulp and Paper Industry Employment



Source: National Industrial Conference Board and American Paper and Pulp Association

PULP AND PAPER

LYDDON & COMPANY (AMERICA) INC.

EXPORTERS OF WOOD PULP TO BRITAIN, SOUTH AMERICA AND ALL OTHER WORLD MARKETS

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PARSONS AND WHITTEMORE INCORPORATED

WOOD PULP

WORLD-WIDE PAPER EXPORTERS

10 EAST 40TH ST., NEW YORK CITY

U. S. EMPLOYMENT INDEXES SHOWING RELATIVE JOB STABILITY

1923 = 100

	All Manufacturing	Auto	Electrical	Heavy Equipment	Iron and Steel	Paper and Pulp
1932	60.4	53.7	69.6	24.9	65.2	83.5
1933	65.8	60.2	69.7	25.0	68.0	88.9
1934	77.7	88.7	98.8	37.2	82.0	103.5
1935	82.8	95.8	95.5	36.9	88.2	105.2
1936	90.7	103.6	112.7	45.0	104.2	108.4
1937	101.9	116.5	144.6	57.9	118.2	114.2
1938	87.5	71.0	78.9	48.7	89.3	103.4
1939	96.3	91.0	79.9	57.9	98.5	108.6
1940	97.9	103.7	107.4	74.6	112.5	116.8
1941	119.8	114.2	158.4	115.9	130.5	125.8
1942	135.6	n.a.	n.a.	n.a.	131.7	123.3
1943	148.5	n.a.	n.a.	n.a.	125.2	113.2

Source: National Industrial Conference Board.
n.a.: Not available but included in total manufacturing.

in every respect. Here and there have been strikes, but time lost by strikes in over-all picture have been negligible. On the Pacific Coast, a model and harmonious relationship has prospered over the past 12 years between the Association of Pacific Coast Pulp and Paper Manufacturers and two American Federation of Labor Unions. Only recently they settled the ninth dispute in their history by peaceful negotiation.

Labor Costs

The APPA has issued this interesting data on U. S. payroll and employment trends during the war:

Production per employee increased from 98 tons in 1939 to 117 tons in 1944. Average weekly hours of labor have increased from 39.2 to 49.4 and wages paid have jumped from 176 million dollars in 1939 to 329 million dollars in 1944.

Labor cost per ton of paper has gone up 50% while prices have risen only 20% within the same period.

Taking figures for a shorter period—1941 to 1944, this data on the U. S. pulp and paper industry is presented by the APPA:

Cost Increase Since 1941

Average hourly earnings	21.8%
Weekly earnings	43.3%
Labor cost per ton	35.5%
Wood pulp prices	13.1%
Waste paper prices	28%
Pulpwood prices	67%
Fibrous raw materials	13.8%
Paper prices	4%

Salaries and wages of the pulp and paper mills of Canada for 1943—the last year of official records—was $71,199,422 for 37,020 employes. This compares with $69,656,393 for 38,251 employes in 1942. For 1944, the dollar undoubtedly has again risen, while the employment total declined.

The National Industrial Conference Board in New York has gathered data showing that the pulp and paper industry is relatively the most stable in employment of practically all principal industries of the nation.

In one study of seasonal changes in 21 major industries, the pulp and paper industry was, by a wide margin, leader of them all. Ranking is made on the basis above and below yearly average in each season. Pulp and paper industry led them all, because its percentage seasonal change was only 3.4%. Electrical manufacturing, paint and varnish, hosiery, paper converting, shoes and chemicals were next in the order named. Far down, in 16th place, was the steel industry, and last, in 21st, was the automobile industry.

Employment indexes for all U. S. manufacturing

EMPLOYMENT, PAYROLLS, HOURS AND EARNINGS IN U. S. PAPER BOX INDUSTRY*

Year.	Indexes of employment and payrolls (1939 = 100) Wage earners	Weekly wages	Average Hours and Earnings Hrs. worked per wk.	Hourly earnings	Weekly earnings
1934	81.3	$66.3	36.6	49.6c	$18.16
1935	84.7	72.7	38.1	49.7c	18.92
1936	90.7	81.7	40.9	48.1c	19.55
1937	99.9	94.9	40.4	51.5c	20.57
1938	91.5	87.3	38.4	54.4c	20.72
1939	100.0	100.0	40.2	54.7c	21.78
1940	102.9	103.3	39.2	56.2c	21.92
1941	117.3	133.7	41.5	60.7c	25.01
1942	110.7	139.8	41.0	67.4c	27.57
1943	120.5	176.8	43.9	73.6c	32.25

*This classification of the Department of Labor includes establishments primarily engaged in the manufacture of fiber cans, cones, cores, mailing cases, ribbon blocks, spools, tubes and similar products; folding and set-up boxes, corrugated and solid-fiber shipping containers, decorated, lithographed, lacquered paper.

Source: Bureau of Labor Statistics, United States Department of Labor.

and for the pulp and paper industry are shown in a chart and also a table accompanying this article. This shows clearly how stable is this industry—a pretty good one in which to have a job.

Pacific Coast Scales High

The Pacific Coast continues to lead the entire world in per capita wages in the pulp and paper industry. It leads all other regions of the continent and is far ahead of the industry in other countries. Wages paid in Scandinavian woods and pulp mill operations, according to the U. S. Pulp Producers Assn., are only one-fifth to one-third of the average for similar industries in the U. S.

A surprise to many in this industry is the disclosure in the statistics shown on these pages that the Southern Zone—more than 30 pulp and paper mills along the Southern Atlantic seaboard—has climbed into second place in the nation in per capita wages.

This important Southern section of the industry—so long considered to have a labor cost advantage over the northern mills—is now ranking right behind the Pacific Coast states in both average hourly earnings and average weekly earnings for pulp and paper mill employes.

As a result of a recent agreement made in British Columbia, the entire coast now has night differential pay and vacations (2 weeks) with pay. Basic wage in British Columbia is 67 cents an hour.

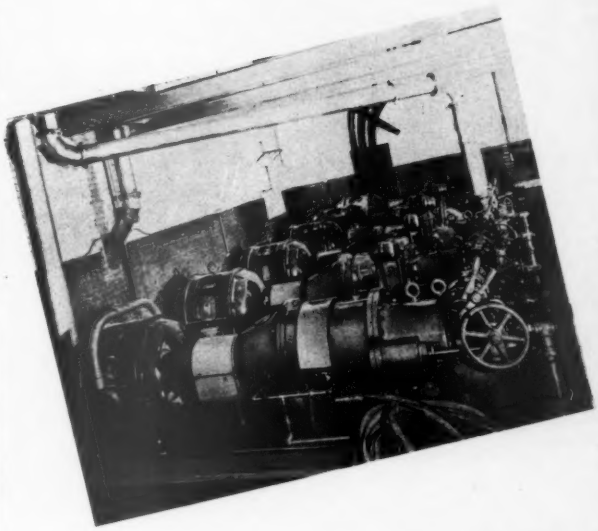
On averages for the entire year 1944, Pacific Coast states show average hourly earnings of pulp and paper mill employes as four cents higher than through 1943 as a result of night differentials and other concessions granted in the last revision of the coast wage agreement.

Hourly wages averaged $1.18 in 1944 on the Coast, as compared with just under 80 cents in 1939. In the South (east) it was 92 cents in 1944 as compared with 60 cents in 1939. The Lake States mills ranked third in 1944—92 cents. Other areas of the South were still lowest in the nation with an average of 83 cents in 1944. These regional figures are all shown in an accompanying chart. The Southeast is still climbing—92 cents was the average for 1944 but for the final quarter of that year, the APPA average was 93.4 cents.

Weekly Averages

As for weekly wage averages, the Pacific Coast rose from $30.12 in 1939 to $51.66 in 1944. The rest of the country went up from $24.65 to $41.70.

The Southern Zone (South Atlantic) climbed from



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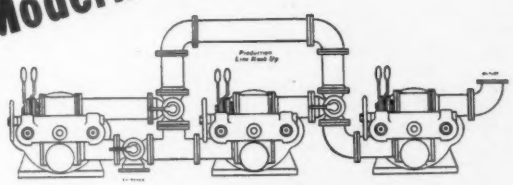

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STATE OF WASHINGTON PAYROLLS AND HOURS WORKED

Year.	ALL HAZARDOUS INDUSTRY OF STATE — Payroll	Workmen Hours	Increase or Decrease Compared With Preceding Year Payroll	Hours Work	PULP AND PAPER MANUFACTURING — Payroll	Workmen Hours	Increase or Decrease Compared With Preceding Year Payroll	Hours Work
1927	$255,669,929	396,071,584			$4,855,526	7,710,848		
1928	271,223,403	414,002,480	6.08%	4.53%	5,573,223	8,507,600	14.78%	10.33%
1929	288,903,912	437,600,400	6.52%	5.70%	7,845,335	12,275,072	40.77%	44.28%
1930	260,002,808	397,369,096	-10.00%	-9.19%	9,110,285	13,874,832	16.12%	13.03%
1931	188,705,890	317,120,680	-27.42%	-20.19%	6,990,889	11,360,944	-23.26%	-18.12%
1932	131,893,000	255,078,920	-30.11%	-19.56%	5,063,638	8,960,224	-27.57%	-21.13%
1933	129,023,888	260,928,662	-2.18%	2.29%	5,166,375	9,693,579	2.03%	8.18%
1934	161,702,804	284,179,483	25.33%	8.91%	7,435,151	11,835,457	43.91%	22.10%
1935	187,578,233	312,935,429	16.00%	10.12%	8,131,888	12,560,285	9.37%	6.12%
1936	241,960,112	379,926,777	28.99%	21.41%	9,858,151	14,638,927	21.23%	16.55%
1937	286,480,085	412,743,811	18.40%	8.64%	12,607,622	16,305,933	27.89%	11.37%
1938	267,784,196	379,432,496	-6.53%	-8.07%	10,227,766	12,254,194	-18.88%	-24.85%
1939	303,602,602	413,236,113	+13.38%	+8.91%	11,919,822	14,197,262	+16.54%	+15.86%
1940	345,887,756	458,512,732	+13.93%	+10.96%	14,517,595	16,905,387	+21.79%	+19.07%
1941	475,291,383	561,751,286	+37.41%	+22.52%	17,236,948	18,234,058	+18.73%	+7.86%
1942	815,109,078	776,362,062	+71.50%	+38.20%	20,724,118	19,642,765	20.23%	7.73%
1943	1,120,516,847	937,602,553	+37.47%	+20.77%	19,879,950	16,787,877	—4.07%	—14.53%
1944	1,270,266,925	1,003,431,671	+13.36%	+7.02%	21,865,943	17,411,977	+9.99%	+3.72%

Source: Department of Labor and Industries, State of Washington.

STATE OF OREGON

Year	Payroll	Work Days	Approximate Number Employees
Fiscal Year 1927-1928	$2,691,220.18	581,833	1,939
Fiscal Year 1928-1929	2,946,218.92	640,724	2,136
July to Dec., 1931, Inc.	1,017,435.13	235,114	1,566
Calendar Year 1932	1,896,692.09	504,311	1,681
Calendar Year 1933	1,819,904.95	535,789	1,786
Calendar Year 1934	2,577,436.84	700,842	2,336
Calendar Year 1935	2,984,889.22	778,547	2,837
Calendar Year 1936	3,578,624.01	839,063	2,697
Calendar Year 1937	4,298,917.22	857,696	2,861
Calendar Year 1938	3,207,313.93	596,405	2,052
Calendar Year 1939	3,089,061.69	580,161	2,044
Calendar Year 1940	3,910,458.40	674,075	2,338
Calendar Year 1941	4,800,939.96	742,011	2,577
Calendar Year 1942	5,465,656.77	759,156	2,622
Calendar Year 1943	6,372,006.72	769,693	2,695
Calendar Year 1944	7,028,481.01	877,478	3,006

Source: Oregon State Industrial Accident Commission.
Data from July 1, 1929, to June 30, 1931 not available.

CALIFORNIA EMPLOYMENT AND PAYROLL DATA

(Based on all contribution reports submitted to department)

Industry	1943 Total Wages Paid	1943 No. of Plants (a)	1943 No. of Workers Jan., Dec.		1944 Total Wages Paid	1944 No. of Plants (a)	1944 No. of Wkrs. Dec.
Total	$19,194,995	136	8,294	8,245	$20,683,393	145	8,712
Coated and Glazed Paper	1,488,545	8	802	634	1,541,469	8	664
Paper Envelopes	1,809,274	14	832	780	1,802,058	14	682
Paper Bags	1,386,903	13	761	740	1,832,669	16	892
Paperboard Containers & Boxes (c)	11,050,975	58	4,419	4,543	6,549,062	53	2,716
Pulp Goods, and Paper Products, not elsewhere classified (b) (c)	3,459,298	43	1,480	1,546	8,958,135	54	3,758

(a) Each branch of a multiple establishment—concern is counted as a separate establishment.

(b) Includes branches of such firms as pulp mills, paper mills and paperboard mills.

(c) Note considerable change between years 1943 and 1944 in classifications "Paperboard Containers and Boxes" and "Pulp Goods and Paper Products, not elsewhere classified." This is due to changing industrial classification of firms manufacturing paperboard as well as making containers and boxes from "Paperboard Containers and Boxes" group (firms fabricating containers from purchased stock) to "not elsewhere classified" group.

Source: California Department of Employment affiliated with Social Security Board Report 127A, No. 47 for 1943, No. 52 for 1944.

$21.82 to $43.68—from the very bottom rung of the ladder in seven regions to second place. The regions it passed in just this last year of reckoning were the Lake States, Middle Atlantic States and New England.

The Middle Atlantic States are now in third place, paying a weekly average of $43.44 compared with $26.74 in 1939.

The Lake States are in fourth place—paying $41.48 as compared with $26.62 in 1939.

The New England States are fifth —$41.21 compared with $24.27. Next are the North Central States —paying $40.05 compared with $25.23 and in the last spot in 1944 were the Southern mills, paying $37.42 as compared with $21.85 before the war.

Figures for the various regions published in last year's Review Number of this magazine showed the Southeast already in second place in 1943, but a revision of the figures in July of 1944—after our Review Number had gone to press—dropped that region back to fifth place. However, by this year their payroll data showed them finally in second place right behind the Pacific Coast.

South's Differential Gone

A National Emergency Council report prepared for President Roosevelt in 1937 stated that the average differential in rates for new labor between the South and the rest of U. S. in 20 industries amounted to 16 cents per hour. The pulp and paper industry of the Southeast, however, was only from 5½ to less

than 8½ cents under the national average for the industry. Therefore, the 16 cent differential wasn't in pulp and paper mills. Instead, the Southern mills, even then, were competing for labor at a disadvantage as compared with other Southern industries.

This table by the APPA shows how Southern paper mill average hourly wages have climbed in comparison with the entire U. S. pulp and paper industry:

HOURLY AVERAGE EARNINGS
(Cents)

	Entire U. S. Pulp & Paper Industry	Southeast Mills
Apr. 1939	.630	.552
Oct. 1939	.639	.557
Apr. 1940	.656	.577
Oct. 1940	.674	.617
Apr. 1941	.688	.626
Oct. 1941	.754	.719
Apr. 1942	.793	.781
Oct. 1942	.856	.837
Apr. 1943	.872	.866
Oct. 1943	.898	.900
Apr. 1944	.900	.889
Oct. 1944	.927	.934

The preceding table shows the Southeastern industry wages (hourly) increased virtually 70% since 1939 while those for the entire pulp and paper industry were climbing just 45%. Today the competitive advantage which these Southern mills supposedly enjoyed has disappeared—in fact, they operate at a disadvantage compared to labor costs of the Northern mills and the remainder of the South.

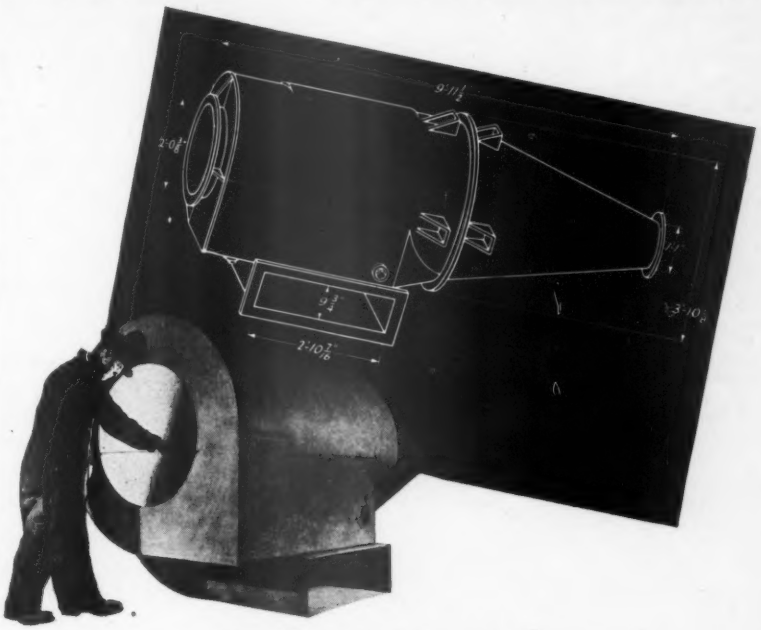
The comparisons in recent years for average weekly wages follow:

WEEKLY AVERAGE EARNINGS
(Cents)

	Entire U. S. Pulp & Paper Industry	Southeast Mills
Apr. 1941	42.0	38.9
Oct. 1941	42.4	43.1
Apr. 1942	43.6	46.2
Oct. 1942	43.5	46.4
Apr. 1943	45.2	44.1
Oct. 1943	46.9	48.7
Apr. 1944	46.4	43.4
Oct. 1944	49.4	47.2

According to the APPA, the entire U. S. pulp and paper industry on Oct 1, 1944, was paying an average hourly wage of 92.7 cents as compared with 87.8 cents for all non-durable goods industries of the country. This margin has been maintained at from 4 to 5 cents an hour over the years.

LARGE DIAMETERS



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U. S. FELT PRODUCTION

Production of paper makers' felts in war years are shown in the table below, as revealed in Bureau of Census statistics compiled for the War Production Board. These figures are comparable with an average quarterly production of 1,291 thousands of linear yards in 1939 (data have been converted to a 54" linear yard measure). After the census of manufacture in 1939, data for this industry were not compiled until 1942.

Production in the third quarter of 1944 was 5.7% below that of the second quarter, but 0.6% better than the third quarter of 1943.

(In Thousands of Linear Yards)

1944				1943			1942
July-Sept.	Apr.-June	Jan.-March	Oct.-Dec.	July-Sept.	Apr.-June	Jan.-March	Oct.-Dec.
1,332	1,412	1,228	1,391	1,324	1,198	1,161	1,059

POSITION WANTED

Canadian, 20 years' experience in modern methods of manufacture of sulphite, desires position as superintendent. Full knowledge of digester cooking, circulation systems, chip packers, heat exchangers, hot and cold acid systems, gas recovery, etc. Milk of lime and stone towers, etc. Rotary and flat screens. Wet, kamyr and fourdrinier machines. Belmar and tower bleaching. Also experience in labor management co-operation. Apply nearest Employment and Selective Service Office. Refer H. O. 2057.

WANTED: Paper mill chemist for middle west combined paperboard mill, carton and container plant; laboratory research and development. Address Box 3, care Pulp and Paper Industry, 71 Columbia St., Seattle 4, Wash.

WANTED — Chemical Engineer with at least two years' experience in pulp and paper mill for technical and investigational work in large, modern, progressive newsprint and sulphite mill in Ontario.

Please do not apply unless your services are available under regulation P.C. 246, Part III, administered by the wartime Bureau of Technical Personnel. Box No. 9, Pulp & Paper Industry, 71 Columbia St., Seattle 4, Wash.

WANTED—Licensed Steam Engineer, one familiar with the firing of sawmill refuse and one capable of supervising maintenance and operation. Apply in own hand writing stating experience, references and salary wanted. Box No. 8, Pulp & Paper Industry, 71 Columbia St., Seattle 4, Wash.

POSITION WANTED—10 years experience timber buyer, woods superintendent of large pulp operations. Also manager of 50M. sawmill. Extensive experience truck and tractor logging. Forestry graduate. Familiar with aerial survey. 32, family. Reply Box 6, Pulp & Paper Industry, 71 Columbia St., Seattle 4, Wash.

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CHEMIST OR CHEMICAL ENGINEER—Development work. Experienced in preparation of wood fibre and general fibre technology—specifically, the cooking, beating, refining and use of wood fibre on paper machines. Marvelous opportunity for the right man. Company is now engaged in essential industry and has unexcelled postwar future. Location —Metropolitan New York Area. Send complete resumes to Box 7, Pulp & Paper Industry, 71 Columbia St., Seattle 4, Wn.

WANTED, Project Engineers and Draftsmen. Pulp or paper mill experience desirable but not essential. Attractive post war prospects. Submit full statement of education, experience, draft status, recent photograph. Reply, Box 4, Pulp & Paper Industry, 71 Columbia St., Seattle 4, Wash.

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NEWS OF *The Pulp and Paper Industry--*

15 YEARS AGO

The first annual report of International Paper Co. for 1929 showed earnings after all prior charges and deductions of $4,011,762. The report said during the year the company arranged disposition of all newspaper investments except for one group, delayed by litigation.

Don S. Leslie, assistant sales manager, Hammermill Paper Co., recently inspected the new paper mill at Hoquiam, Wash.

Niagara Hudson Power Corp., controlled by F. L. Carlisle, president of St. Regis Paper Co., on May 6 purchased a Union Bag & Paper Corp. subsidiary which operates the 120-ton kraft mill in Tacoma, Wash., and owns water rights at Hudson Falls, N. Y.

Roger J. Egan, sales representative of Bulkley, Dunton & Co., presented a paper before the Interstate Meeting of Paper Technologists Club at Kalamazoo, Mich., on May 23 entitled: "Should Pulp Be Shredded, Corrugated or Smooth-Pressed?"

10 YEARS AGO

Champaigne Paper Co. of New York contracted for 2,000 tons of Oregon flax straw for shipment to the company's cigaret paper mills in France for experimental production.

Hammond & Little River Redwood Co., Samoa, Calif., installed a machine to shred redwood bark for commercial orders for insulating and upholstery material.

Japan, purchaser of between three and four million dollars worth of paper and pulp from Canada, threatened higher tariffs on Canadian imports.